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RAILWAY GAZETTE**

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**ELECTRIC RAILWAY TRACTION**

A Supplement illustrating and describing developments in Electric Railway Traction is presented with each copy of this week's issue.

**L.M.S. Progress**

TO have renewed nearly 3,500 locomotives in the last seven years is an accomplishment which only the L.M.S.R., under the presidency of Sir Josiah Stamp, can show. Yet that was but one of many striking achievements he described at this year's annual general meeting. Among them may be mentioned the extent of welding in rolling stock construction, illustrated by the statement that by the end of the present year 384 vehicles will be running with welded underframes; 595 will be mounted on welded bogies; and 922 will be covered with welded steel panels. The application of welding to permanent way is also extending, not only in the building up of worn crossings but in the welding of long lengths of rail; experimental 500-ft. lengths have now been welded together. Important permanent way innovations are the experimental laying of  $5\frac{1}{2}$  miles of flat-bottomed track in the main line, and the introduction of measured shovel packing in maintenance. Sir Josiah Stamp had something to say on the popular demand for speed, which the public asks for regardless—and quite rightly regardless—of the methods

by which the desired result can be attained. With this clearly expressed demand, however, the railway companies are devising the necessary methods to satisfy it so far as possible. They naturally involve difficulties and necessitate precautions, but there is little doubt that so long as the call for speed persists, as it seems likely to, those concerned to supply it will not fail to do so.

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**Rating Savings and Reserves**

At all the three main-line railway meetings so far held this year the Chairman has announced the intention of his company to devote to reserve funds the greater part of the amounts which are recoverable in respect of previous overpayments for local rates and to the freight rebates fund, in accordance with the principles laid down by the House of Lords early last year in the test case of the Southern Railway. This allocation to reserves was not challenged at the Great Western meeting, as the ordinary stockholders of that company have continuously received their 3 per cent. during the past few years, mainly at the expense of reserves. On behalf of Southern preferred and deferred stockholders and of holders of L.M.S.R. preferred and ordinary stocks, pleas were raised for devoting some of the rating arrears recovered towards previous dividend losses. Mr. Holland-Martin at the Southern meeting explained clearly why this could not be done. Neither the preferred nor deferred stock carries a cumulative dividend, and any dividend can be paid only out of the profits of the year. Even if the reduced rating payments had been available in previous years the benefit of them would have had to be confined to the preferred stockholders. Similarly, Sir Josiah Stamp showed that with net earnings in previous years increased by lower rating charges, L.M.S.R. ordinary stockholders would have received nothing. Both chairmen pointed out that the position of junior stockholders would be strengthened by the proposed allocations to reserve and renewal funds.

\* \* \* \*

**The Week's Traffics**

In the satisfactory batch of main-line railway traffics for the past week it will be noticed that the L.N.E.R. has turned its decrease of £24,000 at the end of the previous week into an increase of £44,000, chiefly because of the handsome increase of £41,000 in merchandise receipts. For the corresponding week a year ago the merchandise increases on the L.M.S.R., L.N.E.R., and Great Western were respectively £30,000, £15,000, and £15,000, and coal traffics were also well up, especially on the L.N.E.R. To date this year the four companies have earned £22,266,000, an increase of £329,000, or 1.50 per cent., made up of advances of £203,000 in passengers, &c., and of £225,500 in merchandise, but subject to a fall of £99,500 in coal.

	8th Week				Year to date	
	Pass., &c.	Goods, &c.	Coal, &c.	Total	Inc. or Dec.	%
L.M.S.R. ..	+ 15,000	+ 27,000	+ 19,000	+ 61,000	+ 186,000	+ 2.08
L.N.E.R. ..	+ 8,000	+ 41,000	+ 19,000	+ 68,000	+ 44,000	+ 0.66
G.W.R. ..	+ 8,000	+ 8,000	+ 6,000	+ 22,000	+ 76,000	+ 2.09
S.R. ..	+ 9,000	- 4,000	- 2,000	+ 3,000	+ 23,000	+ 0.85

On the Great Northern Railway (Ireland) the receipts to date show a decrease of £9,450, whereas at this time last year there was an aggregate increase of £6,100. The Great Southern has a net decrease of £1,263, comparing with a net increase of £5,629 a year ago.

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**Indian Railway Finances**

An event of considerable importance both to India and to this country was the announcement at the presentation of the Indian Railway Budget that, for the first time in

the past six years, the railway accounts for the year ending March 31 were expected to show a small surplus of about Rs. 15,00,000 (£112,500) instead of an anticipated deficit of £25,800. This happy state of affairs is due almost entirely to a remarkable improvement in goods earnings during the last few months. Total receipts are expected to exceed £71,000,000, £3,250,000 more than the previous year; and £400,000 higher working expenses will be balanced by the same amount in reduction of interest charges. The estimates for the current year provide for the setting aside of £10,000,000 for depreciation and £23,000,000 as interest. As usual it is the loss on strategic lines that brings down a surplus of £1,500,000 on commercial lines to only £112,500 on all State-owned railways. The figure of £1,500,000 is used again as the estimated surplus on commercial lines in 1937-38, but the anticipated deficit on strategic lines next year is lower. This year's surplus will go towards recouping the Depreciation Fund for the recent years' withdrawals to make good deficits. There is a proposal, apparently, to write off all loans from this fund and all unpaid contributions to the general revenues up to March 31 next. This will enable the anticipated 1937-38 surplus to be contributed to the general revenues, and so assist in financing the reforms in the various provinces. A sum of £6,000,000 is provided for capital works in 1937-38, all but £225,000 of which—for new lines in Sind—are earmarked for open line improvements; £2½ million are allowed for rolling stock requirements, and 2,000 new wagons are included in the programme for the year beginning April 1 next.

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#### Television

Railway scenes formed a popular subject for "shots" in the early days of the films. The reason presumably was the recognition that there is something innately and incredibly thrilling about a train, especially one travelling at speed. It is not surprising, therefore, that the B.B.C. has turned its attention early to railways in seeking suitable programmes for television. Tomorrow (Saturday), for instance, the demonstration of rolling stock arranged by the L.N.E.R. at Alexandra Palace station is to be broadcast for both sound and vision reception. This broadcast may be significant, we feel, as it suggests immense possibilities for the extension of popular technical education. It may be, for instance, that before long everyone will be able to achieve his boyhood ambition of being able to drive a locomotive in theory if not in practice. Another television broadcast of interest to the transport world given this week was that by Mr. Frank Pick, Vice-Chairman, L.P.T.B., who on Wednesday afternoon described, with the assistance of Mr. Oliver Hill, F.R.I.B.A., the British Pavilion at the forthcoming International Exhibition in Paris. Mr. Pick, in describing the pavilion and its exhibits as being planned to be "typically British," mentioned that transport, and railways in particular, would be well represented.

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#### Elimination of Small German Companies

On October 1 next a new German company law comes into force which is based on the premise that joint-stock companies are indispensable as a means of applying the savings of the many to purposes requiring large capital. On the other hand, the principles of National-Socialism demand that the formation of joint-stock companies should be restricted to such cases, hence the minimum capital of new foundations is fixed at 500,000 marks, and the minimum face value of shares at 1,000 marks. Existing companies with less than 100,000 marks capital must be

dissolved or change their constitution on or before December 31, 1940. Shares with multiple voting rights are no longer to be created, and, while amalgamations are not forbidden, certain regulations are imposed on associated concerns. Responsibility for managing the business, in the interests of the nation as well as the shareholders, is concentrated on the members of the board, and the chairman is given over-riding powers. The number of members of council is subject to defined limits, according to the capital of the company, and the powers of the council are restricted to supervision. Except by special invitation of the board, shareholders in general meeting are not entitled to discuss questions of management. It is not known what effect this law will have on the smaller German transport companies, but they appear to come within its scope.

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#### U.S.A. Railways and Flood Relief

Exactly how many refugees were moved to safety by the U.S.A. railways during the floods along the Ohio and Mississippi Rivers will never be known, for in such conditions of emergency no attempt was made to collect tickets. A figure even harder to arrive at must be the number of lives saved by the prompt conveyance of supplies and materials. Special trains, in many cases with lounge cars stripped of ordinary furnishing and fitted up as hospitals, moved refugees at first to the safety of high ground, and later to more distant points in order to distribute the relief work. As well as food, drinking water was sent into the affected districts in tank wagons and locomotive tenders. Trains in the flooded areas sometimes encountered a depth of water which threatened to put out their fires. When it was feared that a general evacuation of the lower Mississippi valley might be necessary, nearly 700 empty box wagons were sent south from North Atlantic cities, while over 1,000 similar vehicles were despatched by railways in the south-east. Had evacuation been called for, the railways were ready to move all the livestock and cotton, as well as the inhabitants. Meanwhile, although all crossings of the Ohio below Pittsburgh were closed by flood, North-South traffic was handled with the minimum delay by re-routing via Memphis, Pittsburgh, Washington, and Hagerstown.

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#### Registered Transits

The British railways have introduced many arrangements in recent years to meet the requirements of trade and industry, and of these, the Blue Arrow and Green Arrow services for the registration of merchandise and livestock by passenger and goods trains have proved particularly popular. The registered transit scheme was introduced by the Great Western Railway in March, 1929, in connection with the conveyance of local consignments by goods train, and in view of the extent to which traders took advantage of the facility, it was adopted by the railways generally in June, 1933, for goods train traffic and in January, 1936, for passenger train traffic. The usefulness of the scheme to the trading community is revealed by the fact that while 5,000 registered transits were forwarded by goods train during the first year the arrangement was in operation, last year one company alone registered over 150,000 consignments. The steady improvements which have been and are being made in the goods train services throughout the country enable the operations of the registered transit scheme to be conducted upon an increasingly wide scale, and the rapid growth in the number of consignments registered is indicative of the extent to which the British railways are meeting present-day trading requirements.

### The 6½-Hour Euston-Glasgow Service

The announcement on p. 558 of this issue concerning the high speed L.M.S. passenger service which is to be inaugurated between Euston and Glasgow in July next has several interesting features. A starting time as early in the day as 1.30 p.m. may occasion some surprise, when a late afternoon service similar to the L.N.E.R. Coronation was expected by many, but the former departure hour is by no means without its advantages. It will widen the usefulness of the train by enabling passengers who so desire to continue to points well beyond both Glasgow and London after arrival at 8 p.m. Further, if the L.N.E.R. Coronation is provided with good Glasgow connections in each direction, this arrangement will offer the passenger a choice of high speed departure times from both cities—an option which we have often urged in these columns in the case of pooled competitive services—at the earlier or later hour at will. That streamlined locomotives would be built for working the trains was to be expected, after the successful experience of the L.N.E.R. with the Silver Jubilee, which has indicated that economies in fuel consumption are made possible by streamlining at such speeds as these. With a schedule allowance of 6½ hr. on a journey which has already been experimentally completed in 5¾ hr., there should be ample margin to ensure strict timekeeping on this new service.

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### Relaxing French Speed Limits

During the year 1936 the first steps were taken in France to relax the limit on the maximum speed of steam-hauled passenger trains which has operated for 83 years past. As is well-known, the figure hitherto fixed has been 120 km.p.h., or 74½ m.p.h. It is now permissible on the Nord, with trains of all-steel stock running over lines equipped with automatic block signalling, to travel at speeds up to 130 km.p.h. (80¾ m.p.h.), and later on this year will be up to the higher figure of 140 km.p.h. (87 m.p.h.). The main line between Paris and Lille satisfies the conditions over the 88¼ miles between Creil and Arras, of which the 47 miles between Creil and Longueau are used also by the expresses from Paris to Boulogne and Calais, and the limit was raised early in October last. The relaxation has also been extended to the main line to the north from Creil as far as Tergnier, 50¼ miles. It will be interesting to see what effect these changes have in the future on Nord schedules. Hitherto the Nord speed reputation has been built up largely on the excellence of the uphill work performed by its locomotives, and if to this there be now added steady speeds of 80 m.p.h. and over downhill, the effect on the timetables cannot but be remarkable. Over certain sections of the Est main lines, also, maximum speeds of steam-hauled trains are now permitted to 125 km. (77½ m.) p.h., and over certain Etat main lines 130 km. (80¾ m.) p.h. The P.O.-Midi electrically-hauled trains are already authorised to travel at 80¾ m.p.h. between Les Aubrais and St. Pierre-des-Corps.

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### Level Crossing Locking in Italy

Many of the level crossings on the Italian State Railways are protected by signals worked from a box and interlocked with gates or barriers on the principles accepted in Great Britain. There are others, however, where the expense of such equipment is not warranted, and yet it is felt that some more positive protection is needed than a gateman's vigilance, even when supplemented by automatic warning apparatus. In recent years a number of installations of key interlocking have been provided. A key instrument,

in which two keys—one for each direction—are inserted, after removal from a control lock on the closed barriers, is electrically interlocked with the nearest signal box through electric slots or replacers, on the relative signals, so that the barriers must be secured before a clear signal can be shown for an approaching train. A key remains back-locked in the gatehouse instrument until released by a train actuating a rail contact on the corresponding line, but the signal concerned must, of course, be at danger for the key to be withdrawn to unlock the barriers. An improved design of instrument has lately been produced by the State Railways signalling staff, and was described in the October, 1936, issue of the *Rivista Tecnica delle Ferrovie Italiane*.

\* \* \* \*

### Flexible Wheel Arrangements

The leader entitled "4-6-4 + 4-6-4" which appeared on page 365 of our issue last week, has moved a correspondent to write us condemning wheel arrangements of what he calls the "ultra-flexible" description. His criticism is based mainly on alleged instability of running where, particularly in high-speed locomotives, 4-wheeled bogies are placed one at each end of a rigid wheelbase. This argument has often been heard, but has been disproved in practice over and over again. It was forcefully urged at the time when Baltic, or 4-6-4 type, tank engines looked like coming into general favour on certain railways, but the oscillation tests carried out in 1922 with the Billinton tank engines having this wheel arrangement on what was then the L.B. & S.C.R., on the subject of which an article appeared in THE RAILWAY GAZETTE of August 4, 1922, did much to annul adverse opinion on the point and settled the question finally. In any case, an articulated locomotive is altogether different from a so-called "rigid" engine, notwithstanding which, locomotive engineers have long ceased to look askance at what are sometimes called symmetrical wheel arrangements where circumstances warrant their use. The use of trailing 4-wheeled bogies in locomotives of widely differing types is becoming quite common in certain foreign countries, and is not restricted to tank engines as is the case on British railways. This development is consequent upon the larger and heavier fireboxes nowadays used, which add much to the weight of the engine at the rear end.

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### Lost Property

According to Mr. W. J. Turner, head of the L.M.S.R. Central Lost Property Office at Derby, there is a period of the year at which railway travellers are particularly prone to forget their umbrellas. It falls during September and October, "when people have started to carry umbrellas again but are not yet accustomed to them." The loss of some objects which find their way to Derby, however, can hardly be explained by Mr. Turner's theory. Momentary forgetfulness might cause a man used to the less adventurous walks of life to leave his deep-sea diving boots on the rack; but we do not think that passengers of either sex could excuse the abandonment of such daily lifebelts as bottles of liver salts, beauty cream, and beer, on the grounds that they are "not yet accustomed to them." Judging from our own limited experience of seafaring, too, we do not feel that a sailor entrusted with the transport of his ship's bell would normally leave it behind him, for no mariner, ancient or otherwise, can find himself within striking distance of one of these instruments without performing upon it at short intervals, particularly during the night. And would Mr. Turner also explain on the grounds of unfamiliarity the loss of 100 pairs of trousers in Belgian trains last year?



## An Indian Railway Training School

IN view of the recent decision of the London Midland & Scottish Railway to open a staff training college at Derby, under Colonel L. Manton, the article we publish on page 419, in which Mr. V. L. Dean, the late Principal of the Walton Training School on the North Western Railway of India describes that institution, is of more than ordinary interest. It should be noted in passing that the Walton Training School at Lahore has no connection with the, now defunct, Railway Staff College at Dehra Dun, described and illustrated in our issue of January 24, 1930, the buildings of which now house the "Indian Sandhurst." Actually, however, the school has now taken over some of the duties of the college, in respect of training North Western Railway officers. Like the proposed school at Derby, the Walton Training School is residential, but instead of accommodating only 50 railwaymen students, it caters for 350 students, apprentices and railwaymen students at a time. Perhaps the most important point about the North Western Railway school is that subordinates in almost all departments must take its courses and qualify by examination before they can be promoted to the more senior grades, whether they are in the Commercial, Transportation, Locomotive Running, Way & Works, Signal, Telegraph or Bridging Departments; probationary and student engineers and other officers also undergo special courses.

The school contains the largest and best-equipped transportation model room in India, or, probably, in the East, where every system of block-working and signal work is demonstrated on the miniature railway and with full-sized instruments. Locomotive running and carriage & wagon students also have their practical demonstration rooms, with a locomotive, partly in section, brake gear, and a wagon—defective as it may normally become after some time in service—to assist in their training or refresher courses. Nor is the practical side of the commercial students' training neglected, as they, too, have their demonstration room, which includes fittings and appliances for their work. Men are trained not only in the work of their own departments, but also in general railway working, rules and regulations, and everything that is likely to be useful to them. Outdoor facilities are provided for permanent-way work training and, taken altogether, the equipment of all kinds throughout the school is very complete.

The courses of instruction, too, are remarkably comprehensive, as may be seen from the selected list and syllabuses embodied in Mr. Dean's article. There are first of all courses to train youngsters entering any of the seven departments already enumerated, and enable them to pass examinations and take their places on the staff. Then there are more advanced courses for men who have had opportunity to become proficient in their own particular duties, to enable them to study all phases of work necessary for them to pass examinations to qualify for promotion as stationmasters, locomotive, carriage, block signalling, signal, permanent way, bridge, commercial, or transportation inspectors, cabin assistants, foremen in the various departments or other senior subordinates posts. The refresher classes also enable men of all branches to renew their acquaintance with all kinds of work, and the young engineers' course, explained fully in the article, gives them a thorough grounding in way and works subjects, and insures that, when they pass out as officers of the railway, they will be able themselves to do anything they expect of their subordinates. The school, too, is very up to date, and, for instance, already has special courses to fit commercial students to investigate and combat road motor com-

petition, both passenger and goods. For specialised instruction such as in permanent way and other engineering subjects, selected senior officers are detailed by the heads of departments to lecture to and instruct students and student railwaymen at the school. Here too, the tuition is quite modern, and includes such instruction as in the use of the Hallade track recorder.

While, therefore, the extent and scope of the Walton school differ considerably from the Derby scheme, there are probably many points that may be in common, not the least of these being the encouragement of friendly rivalry on the recreation grounds, and in any case, the article upon the Indian school is likely to be of interest to other Overseas railways, especially as it gives examples of the work carried out there in considerable detail. We cannot help feeling that some such training and refresher institution is on the right lines, and that it should be suitable for many of the larger railways in the dominions and colonies, modified, of course, to suit local conditions. Whether the railways of this country will ever come to consider any such training institution for recruits as suitable to their own requirements, is a matter that lends itself to useful discussion. At any rate, the courses for railwaymen students may prove useful for comparison with the Derby and other similar schemes in Great Britain. Also, the general equipment and scope of the Lahore school, are believed to have elicited very favourable comment from the members of the Wedgwood Committee when they recently visited it.

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## South Africa and Rhodesia Agreement

IN our Overseas columns recently we gave the bare outline of the agreement entered into between the Union of South Africa Government, the Southern Rhodesia Government, and the Rhodesia and Mashonaland Railways. As further information is now to hand we are able to amplify the provisions of this agreement. The preamble sets out that the Union Government claims, under a contract of August, 1894, between the Crown Agents for the Colonies and the Government of British Bechuanaland, the British South Africa Company and the Bechuanaland Railway Company, that there exists a right to purchase the section of line from Vryburg to Palapye. This claim was disputed by the Rhodesia and Mashonaland Railways. The Union Government wished this right to be admitted definitely and formally, and it also desired that for a period of 33½ years the import traffic from Union ports and Union port towns, conveyed over the Rhodesia and Mashonaland Railways should be maintained, as far as practicable, in its present proportion of the total import traffic conveyed over those lines. The Union Government desired also that the same classification of railway rates as is from time to time applicable to traffic in the South African Railways be fixed for the section of the Rhodesia Railways between Vryburg (inclusive) and Ramathlabama (inclusive) in respect of purely local traffic conveyed between these two points.

The Rhodesia and Mashonaland Railways, on their side, desired that the right claimed by the Union should not be exercised for 33½ years. The Rhodesian signatories unreservedly admitted the Union's right to purchase and, subject to the consent of His Majesty's Government in the United Kingdom, admitted that the right is vested solely in the Union Government. In return, the Union Government has agreed not to exercise this right for the period mentioned. The Rhodesian authorities bind themselves not to take or initiate any action which may directly or indirectly divert import traffic from Union ports or Union



port towns to the port of Beira. In particular, but without derogating from the generality of the obligations set out, the Rhodesia and Mashonaland Railways undertake that, unless otherwise mutually agreed between their administrations and the South African Railways, no increase will be made in the existing rate preferences at Bulawayo in favour of Beira over Union ports and port towns in respect of traffic consigned to Bulawayo and places north of it in the direction of the Congo. The Rhodesia and Mashonaland Railways agree that passengers and all descriptions of traffic transported locally from points on the Vryburg—Ramathlabama section to points on the same section shall be charged at S.A.R. tariffs. In the event of the liquidation of the Mashonaland Railway Co. Ltd., and the transfer of its undertaking to the Rhodesia Railways Co. Ltd., the latter company undertakes to assume all the rights and obligations under the agreement. It is satisfactory to learn that this thorny problem has been solved with results so much to the liking of all concerned.

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### Railways and Road Competition

WHEN addressing the L.M.S.R. stockholders on Friday last, Sir Josiah Stamp crystallised railway prospects by pointing out that while the receipts per unit of work done do not rise, but may even be still further depressed by competition, the corresponding costs are steadily going up through circumstances over which the railways have no control. With regard to the tendency of freight train receipts per ton to diminish, Sir Josiah contended that the effect of recent legislation in imposing more equitable conditions upon the road haulage industry, had been to add materially to its costs, with the result that many of the smaller concerns have been cutting freight rates to an uneconomic point in order to increase their carryings. This has caused the rates situation as between rail and road to become decidedly worse, at any rate temporarily. The ability of road hauliers to pick and choose traffics and to change rates and charges without any responsibility for transport as a whole is steadily wearing down the upper ranges of the railway rates classification on which the industry of the country has been established, and cannot be continued indefinitely.

With this fact in mind, Sir Josiah took the opportunity of endeavouring to remove the misconception which exists in many quarters as to the reason for the railway companies' recent opposition to the renewal of certain "A" licences after their original term had expired. With great clarity he pointed out that these licences were issued automatically for a transitional period of two years, so that the possibility of the railway companies lodging objections did not arise until the expiration of that period a few months ago. The objections then lodged by the railways were directed to cases where the traffics were of the kind which had been originally and still were on the rail; where the rail facilities were substantially equivalent and ample; and where the length and directness of the haul put the particular advantages of road transport at a minimum. In this connection it is important to remember that the Road & Rail Traffic Act, 1933, implements the principal proposal of the Salter Conference, namely, that the granting of licences would be against the public interest if it were considered that existing transport facilities suitable to meet the public requirements to be served by the applicants were already sufficient.

The results of the railway appeals appears to indicate that while the statutory provisions may regulate the extension of road haulage, they do not take into consideration the vital question of the level of the rates; nor do they permit attention to be paid to the desirability of the

existing railway facilities being more fully employed than at present, although it was clearly the intention of the legislature that wasteful competition was to be avoided. The railway obligations in regard to charges, publication of rates, non-discrimination, and obligation to carry, are so onerous when compared with the conditions under which road hauliers operate that there appears no possibility of securing any form of co-ordination in these two branches of transport until these conditions and regulations have been equalised as far as is possible. Any such equalisation can be effected only by further legislation, and, when this has been achieved, Sir Josiah reiterated the willingness of the railways to allow the division of traffic as between rail and road to settle itself upon purely economic lines, subjecting, however, the particular interests of the community to any over-riding considerations which may be necessary in the interests of the country as a whole. As was to be expected, Sir Josiah's lucid exposition of the railway attitude brought forth a protest on behalf of certain road interests. The statement was published on Tuesday by the British Road Federation, and the same day Sir Josiah issued a point-by-point reply, both of which we set out on pages 454-5. It is difficult to see in what way the case for road transport could be helped by the remarks of the British Road Federation, as certain fundamental inaccuracies therein were easily demonstrated in Sir Josiah's prompt reply.

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### A Goods Handling Revolution

SOMETHING in the nature of a revolution has been accomplished quietly but thoroughly in the last year or so on the London Midland & Scottish Railway, and it is described in an article on pp. 423-432 in this issue. Ever since railways began, the methods of handling merchandise at depots have remained static in principle, although machinery has been installed to some extent to reduce the labours of men and to ease the movement of heavy consignments. But the general method of transferring the average miscellaneous traffic between rail and road, and from one wagon to another has, until the reforms described in our article were put into operation, not been changed. This handling of goods has added materially to the cost of its transport by rail, and with the advent of road competition this factor became one that called imperatively for attention.

The unloading of the wagon on to a deck, the barrowing of the consignments across and along the deck, the dodging of other packages standing thereon, have been practices so long established, that the elimination of decks altogether may justifiably be described as a revolution; yet that is what has been done by the L.M.S. authorities, and this reform, coupled with the virtual elimination of barrowing and its replacement by direct loading and unloading between rail wagon and road dray or lorry, has already saved substantial sums, though only about 150 of the 3,000 L.M.S. goods depots have so far been dealt with. When the principles described in our article have been applied throughout the system, the savings will run into many hundreds of thousands of pounds a year; and what is almost equally important, although not easily estimated financially, is the resultant acceleration of goods movement. There are, of course, other incidental advantages, such as the lessened risk of damage to goods in transit owing to the reduced and more gentle handling made possible by such simple but ingenious innovations as the "anvil" device described, and, at the larger depots, the wagon unloading machine.

No doubt some surprise may be expressed at the continued use of horses in such modern depots as that about to be put up at Derby, but, like all the practices in con-

nection with the scheme of reform, it is the result of exhaustive tests and analyses of alternative methods. With the special automatic coupling which enables a horse to be attached to a dray in a couple of seconds, the movement of drays within certain large depots has been found to be quicker as well as cheaper under this method of traction than any other. An interesting point brought out in the tests was that the horse reacts to the man. A man with a lively step and quick action finds that his horse imitates him, and it is not inconceivable that there may even be a reflex action on the man. It is just to pay a tribute to Mr. E. J. H. Lemon, Vice-President of the L.M.S.R. for Railway Traffic Operation and Commercial Section, to whose initiative and engineering genius the institution and carrying through of this important revolution are mainly due.

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### Signal Structures

AN important, if seldom discussed and scantily documented, aspect of the signal engineer's work was ably dealt with before the Institution of Railway Signal Engineers on January 27 by Messrs. H. Birchenough and J. Wright, of the L.M.S.R., in their paper on "The Design of Signal Structures." In spite of the apparent simplicity of some of the questions involved, there has long been diversity of opinion about signal structures. The increased cost of timber is now advanced as a reason for steel structures, but long before this some railways adhered almost exclusively to the lattice type of post, while others would not hear of using anything but timber. Although timber posts were fairly generally used in England, most Continental countries had very few, even where timber was readily available, but preferred lattice or, in some cases, steel section construction, generally of a heavy type, enabling tall signals and bracket posts to be used without guy wires.

Where disc signals were common there was a large demand for side bracket structures, if these were parallel lines of rail, to bring the discs over the lines to which they applied, a necessity with signals which practically disappear when cleared. With semaphores, giving a positive signal, equally visible at all times, it was possible, though not perfectly satisfactory, to place signals in pairs on one side of the railway, a condition found on some of the four-track routes out of London constructed without sufficient space to put posts between the lines. The tall signal posts, frequently carrying co-acting arms—long familiar features on these routes—are giving place in the case of many distant signals to colour-light units in connection with the provision of increased braking distances for high-speed services, and gantries are being erected to carry the signals in the correct relative positions. In designing them, the different character of the new signals has to be considered, and it is found advisable to give them extra rigidity to prevent disturbance in the alignment of the indication beam by vibration. The adoption of light signals has also been responsible for the increased use of pipe signal posts, although they are also being used for semaphores by one line at least, some very neat designs having been worked out. The pipe post was extensively used in America during the earlier years of automatic signalling, now spread so widely in that country, and was seen in the first pneumatic and electro-gas signals installed 35 years ago in England, but beyond a few cases here and there made little headway until the light signal found favour. Posts made of old rails are also seen, and concrete posts came into evidence during the war.

The system of route or directional signalling aspects, universal practically from the beginning in Great Britain,

has led to a considerable use of bracket posts, which formerly were often more elaborate than now, owing to the multiplication on some lines of distant signals in the rear of junctions. These bracket structures were expensive, and the advocate of speed signalling points to the simplicity and cheapness of having a straight post at every location, which suffices for his code of aspects. The junction indicator, however, offers this advantage while retaining the route signalling principle, and is, we believe, proving very satisfactory in practice. While mechanical semaphore signalling lasts in this country, however, as it probably will for some time yet, we are not likely to see much, if any, departure from our long established methods of junction signalling, and the satisfactory design of the necessary signal structures will continue to claim attention. On the relative merits of lattice girder and steel section work, and of welding and riveting, there will continue to be differences of opinion, but it is worth noting that welding has been successfully applied on the Continent, not only to the fabrication of signal brackets and gantries, but to complete framings for signal boxes, and the practice is being extended.

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### Power Signalling in the Twentieth Century

AT the opening of this century, power operation of points and signals was only beginning to attract serious attention in Great Britain. The electro-pneumatic system was in use at the Spitalfields goods yard, G.E.R., using a locking frame of the type adopted in America, where the apparatus was already in use at several places. British railway authorities were inclined to be conservative in such matters, well satisfied, as they had good reason to be, with the high degree of safety achieved with the aid of older appliances, with which, in contrast to American lines, theirs were everywhere well equipped. Nevertheless, a great change was by then in preparation. Within a few years automatic signals controlled by track circuit were at work on the South Western and the North Eastern Railways, and on the Great Northern and City tube, with power frames of different sorts, while the electro-pneumatic system had been decided on for the electrification of the District Railway and the new tubes then building.

In his Presidential Address to the Institution of Railway Signal Engineers on February 24, Mr. H. M. Proud, who has been closely associated for many years with the leading developments in this field, recounted the chief steps in the engineering achievements which have resulted in the high class apparatus now available, without which the intensive services provided on electric underground and suburban lines would be practically impossible. Electric traction brought new problems for the signal engineer, obliged to safeguard his equipment from false operation or damage by extraneous currents. On most London electric lines the use of an insulated traction return possibly simplified the task to some extent, though not installed for that purpose, but experience brought unexpected difficulties. The early polarised direct current track circuits, designed specially for electric railways, gave very satisfactory service, but the development of the alternating current type finally placed electric railway signalling on a sound basis, while rendering useful service to steam lines as well. This progress has not been achieved without much expensive research on the part of the signalling industry, in collaboration with railway signal and operating officers, who have contributed their part by welcoming and trying every improvement which specialists like Mr. Proud have been able to suggest.

## LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of correspondents)

### Railway Carriage Pictures

Photochrom Co. Ltd.,  
Royal Tunbridge Wells.

March 2

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—I take it you will agree with me that discussions must come to an end. Nevertheless, there are good replies to the three points Mr. Grasemann made in his letter in your issue of February 26.

(1) The efficient photographer does not photograph ugly buildings or ugly trees, but carefully selects his composition.

(2) There is colour photography to supplement monotone.

(3) Largely a matter of staff and facilities.

I hesitate to refer to "cheapness" where artistic effort is concerned, but in reply to the last paragraph it would be necessary to order a larger quantity per subject from paintings if price is to be lower than photographic prints, and this means a smaller selection of views from which to work.

I hope nothing I have said would suggest that I am "knocking" artists' work, but there is as much scope for one as the other, and the only point in my previous letter, and this, is to show that the facilities extended to the artist are equally available to the camera man who works with his head as well as his lens.

Yours faithfully,

F. M. LAMBERT

### "Connections"

London, February 15

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—Mr. W. B. Thompson, in his letter on "Speed" which you published on January 29, says that "most of our train services need to be entirely replaced." The same view has often been expressed—though, perhaps, rather more guardedly—in your columns and in the daily press (witness *The Times* letters on "London to Inverness" and on "Railway Time Tables"), but surely it has never received more striking support than from "Veritas" in your issue of February 5. Unless we are to believe that the "connections" Veritas quotes cannot be given, or improved, by reason of the habitual unpunctuality of the trains concerned, the only conclusion must be that little has been done to weld together the sectional train services of the group referred to (we know, only too well, from the evidence of joint train service posters that there has been no real attempt to pool the services of different groups), and this conclusion is the more disheartening when we remember that the planning of "connections" has been greatly simplified by the fact that the seven railways once serving Carlisle have been reduced to two, and the three at Carnforth made into one. Well may travellers to these unfortunate areas be "depressed," both by the apparent lack of co-ordinated effort to facilitate access to them, and by the slow transport within their borders, for the average journey time by all daily trains between Barrow and Whitehaven (46 miles) has risen from 102½ minutes in the last pre-war winter to 109 minutes today.

But "Veritas" has not exhausted the list, even at Carlisle. He might have added (as further proof of the obstacles to travel between Yorkshire and West Cumberland) that the third and only remaining day express arrival at Carlisle from the old Midland Railway, at 6.23 p.m., just misses the 6.15 to Workington, and that 1.34 p.m. is the arrival at Carlisle from Workington to "connect" with the 2.45 departure to Leeds (now the last express departure of the day to that district), while passengers from Lancashire to the border towns of Hawick and Galashiels (deprived of their pre-war through services via Hellfield) reach Carlisle at 1.12 and 6.30, just missing the departures at 1.3 and 6.29. He might also have mentioned that, out of five L.N.E.R. departures from Penrith, three—at 1.0, 4.13, and 7.33 p.m.—leave just before the arrival of fast trains from Carlisle (the question of connections at Appleby between the trains

of the two groups seem to be ignored), and have instanced the 74-minute wait at Carnforth enjoyed by passengers for Kendal who use the 8.34 p.m. service from Carlisle, and the 33-minute wait at Oxenholme by passengers who catch the 7.12.

That the Silver Jubilee attracted London traffic from the Carlisle and West Cumberland district is perhaps inevitable, for the Carlisle area could never support a morning high-speed service to the south to the extent that Newcastle can. But the 8.30 a.m. from Carlisle to Euston, mentioned by "Veritas," has long been the most popular train of the day for passengers for the south from the Lancaster and Carlisle area, and invariably leaves Carnforth with a trainload for south of Crewe. Yet its journey time over the 236 miles from Carnforth to Euston is 5 hr. 37 min. as compared with 5 hr. 52 min. in 1900, when it stood 16 instead of 6 minutes at Rugby to be combined with a Manchester to London service! And, while dealing with Carlisle, "Veritas" could fairly have complimented the L.N.E.R. on the present Newcastle and Glasgow (Central) train service—one of the very few instances where the claims of a "group" route have not caused pre-war facilities to vanish, although the through carriages, which once ran via Carlisle on the 1.18 from Newcastle and 2.0 from Glasgow, have long since disappeared.

Yours, &c.,

VIATOR

### Train Numbering

Sedlescombe Road North,

St. Leonards-on-Sea February 26

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—There is certainly much to be said for the simplification of references to individual trains and it would be interesting to see, if a system of numeration were adopted, whether the public readily took to the idea. The popular use of names for certain expresses has certainly grown extensively among travellers and won approval.

The Great Northern for many years numbered all its trains in its working timetables, the numbers being used generally by officials and among the staff both verbally and in operating instructions; such system being still continued on that section under L.N.E.R. auspices. Indeed, I believe that though running times may have been altered on one or more occasions, many trains are still operated between London and York, &c., under the same numbers which they held many years before the war.

A typical example which applies to both up and down trains and is of very long standing is No. 562. No. 562 down is the famous Glasgow express freight leaving King's Cross Goods at 3.40 p.m., while its counterpart in the opposite direction is the heavy Newcastle (and later Edinburgh) luncheon car express now due at Kings Cross at 4.15 p.m. I well remember watching the arrival of this train at No. 5 platform some years ago, for the driver of *Flying Fox* (now retired) flourishing his watch to show that he had kept time, called out to me: "Here we are: 562 up and 562 (tare!) tons!" A curious feature of modern numeration is that the *up* Silver Jubilee is No. 530. I do not think it has ever been possible to make a train number agree with its departure time, the 5.30 down being No. 530, for instance.

The numbers appearing on the route discs normally carried on the front of Southern locomotives are, of course, engine diagram numbers from which, if one knows the code, the shed from which the locomotive is working may be learned; it is only on summer Saturdays or other very busy days that train or traffic-working numbers are carried in addition on boards near the foot of the chimney. So far as I am aware, the significance of the latter numbers has never been explained publicly.

Yours faithfully,

R. A. H. WEIGHT



## PUBLICATIONS RECEIVED

**Dry Rot Investigations in an Experimental House.** (Department of Scientific and Industrial Research: Forest Products Research Records—No. 14. Mycology Series No. 1.) London: His Majesty's Stationery Office. 9½ in. × 6 in. 14 pp. Illustrated. Price 6d. net.—The data upon which this report is based have been collected over a period of six years, and the conclusion is drawn that the design of a building is even more important in the prevention of dry rot than is freedom from infection in the timber. Principles are laid down for constructing the type of floor found most efficient in this respect, which, having proper ventilation and protection from moisture, will resist the development of dry rot fungus even if purposely infected.

**The Lynton and Barnstaple Railway, 1895-1935 (Third Edition).**—By L. T. Catchpole. Sidcup, Kent: The Oakwood Press, 19, The Drive. 5½ in. × 8 in. 67 pp. Illustrated. Price 3s. 6d.—Mr. Catchpole is determined that we shall not quickly forget this charming little railway, which never failed to fascinate the visitor to North Devon, but which quite failed to withstand the competition of road transport. That demand should warrant this third edition, however, is also a tribute to the author's treatment of the subject. With the aid of the photograph and the artist he has, indeed, provided just the sort of obituary that appeals to the enthusiast. Moreover, the book is excellent value for the money, quite apart from its sentimental appeal. There are one or two innovations in this edition which may be noted. In addition to a general revision, better quality paper has been used, and a rearrangement and addition to the illustrations has been carried out. If Mr. Catchpole's publishers decide to produce yet another edition, we suggest that a sub-title be added—*Vale atque Ave*, not *Ave atque Vale*.

**Procedure Handbook of Arc Welding Design and Practice.** 4th Edition. Cleveland, Ohio, U.S.A., 1936: The Lincoln Electric Company. 6 in. × 9 in. Price \$1.50 in U.S.A., \$2.00 elsewhere.—The first edition of this handbook appeared in 1933; since then it has been considerably enlarged, and its contents improved. In the present form, with a total of 819 printed pages and nearly a thousand illustrations, it has become a reference guide of remarkable completeness. Welding methods, technique, and equipment are dealt with in the first parts, followed by chapters on welding speed and cost, including carbon arc and automatic welding, then the metallurgical side of welding is discussed, covering the weldability of steel and various metals and alloys. The succeeding chapters, comprising two thirds of the book, deal with aspects of welded design for machinery and structures, and include, in 200 pages, many photographs showing applications

of arc welding in nearly every field of engineering.

In recent years problems of welding design have been given increasing attention and the book will be of considerable value for the abundant ideas it puts forward in this direction. Perspective sketches of hundreds of welded joints are reproduced, which will appeal to designers, draughtsmen and welders as well. Theoretical problems are not obtruded, but simple methods of stress computation are explained, and figures, tables and diagrams help to carry out the necessary calculations. The practical point of view is in the forefront, and the designer is constantly reminded to think in terms of workshop practice, assembling, use of jigs, shrinkage, and cost of the finished job. Many of the joints illustrated do not conform with practice in this country or on the Continent, but they are most interesting by their infinite variety.

**Student Travel.**—An advance notice has now been issued of the programme of Continental holidays arranged by the National Union of Students for the coming summer, and is obtainable from the union's offices, 3, Endsleigh Street, London, W.C.1. The tours are planned for pleasure, sport and education, in the latter category coming visits for engineers to the Ruhr district of Germany. Prices are low, the accommodation being usually on simple lines, but opportunities are offered for travel to places off the beaten track of ordinary pleasure traffic. The N.U.S. Travel Department caters both for graduates and students of the British universities.

**Continental Holidays.**—Prospective visitors to Switzerland, or to Holland and Belgium, will find useful suggestions for spending their time fully but with economy in two illustrated folders from Thos. Cook & Son Limited, Berkeley Street, W.1. That devoted to Switzerland, which is partly in colour, lists a variety of facilities ranging from a 15-day escorted tour of the country to a "no rucksack" rambling holiday centered upon Lauterbrunnen. Inclusive charges for transport (with choice of sea routes) and accommodation are quoted. The Belgium and Holland folder gives particulars of visits varying from twenty hours to fifteen days to coastal resorts and centres of historic interest.

**Fabrication of Stainless Steel.**—A lecture on this subject by Mr. F. D. Gordon to the Works Management Association has been reprinted by Samuel Fox & Co. Ltd. (an associate of the United Steel Cos. Ltd.), of Stocksbridge, Sheffield—maker of Silver Fox stainless steels. It now forms a concise and well-illustrated pocket guide to the modified technique of fabrication processes necessary in dealing with these materials. Several pages are devoted to welding, and the electric arc process is recommended owing to the minimised distortion and reduced risk of weld decay. A paragraph on polishing

methods indicates the value of stainless steels for display purposes. The L.N.E.R. streamlined Pacific No. 2512, *Silver Fox*, is illustrated, all its exterior bright fittings being made from the firm's austenitic stainless steel.

**Materials Handling Plant.**—Many interesting illustrations of materials handling plant are reproduced in a catalogue issued by the General Electric Co. Ltd., Magnet House, Kingsway, W.C.2, of equipment of this type manufactured at the Fraser & Chalmers Engineering Works. The maker is associated with the Robin's Belt Conveying Company, whose system is used in this plant. Fuels, sand, cement, gravel, and engineering parts are among the materials which are shown being economically handled on industrial premises and at docks by Fraser & Chalmers installations. Railway applications are represented by a coal-handling plant with a capacity of 500 tons an hour installed by the Southern Railway on the Eastern Admiralty Arm, Dover; and by a coaling plant for the Lunghai Railway, China, which can handle 20 40-ton wagons an hour.

**Arc Welding for Steam Generators.**—Babcock & Wilcox Limited, Babcock House, Farringdon Street, London, E.C.4, has reprinted in neat booklet form a paper by Mr. H. Harris, Metallurgist at the company's Renfrew works, on "The Utilisation of Metallic Arc Welding in the Construction of Steam Generating Plant." This paper was read by Mr. Harris to the Scottish Branch of the Institution of Mechanical Engineers, and is reproduced by permission of the council of that institution. In forty-five pages, a practical and up-to-date summary of the subject is presented, clarified with numerous illustrations. After considerable attention to hand and machine welding of boiler drums and pressure vessels, the paper describes tests and examination of welds, followed by a survey of metallurgical considerations which is abundantly illustrated with microphotographs.

**Copper Conduit Tubes.**—We have received from I.C.I. Metals Limited, Kynoch works, Witton, Birmingham, 6, an illustrated booklet describing the Broduit copper conduit system for electrical wiring. The advantages of copper conduit tubes are that they do not rust or require an artificial outside coating, while being electrically conductive, strong, and neat. Broduit tubes are solid drawn and of light gauge; used in conjunction with the makers' Everdue conduit boxes and fittings, they form a completely non-ferrous solder joint system, the tubes being unscrewed. They can also be used with standard screwed fittings by means of threaded adaptors. Bending is simplified by use of a spring device which avoids kinking or distortion, and the dead smooth interiors of the Broduit tubes facilitate the threading of the wires. This informative booklet includes notes on the correct procedure for the erection of Broduit copper conduits.

## THE SCRAP HEAP

### HORSE-TRAMS COLLECT FOR CHARITY

A novel means of raising money for charity has been devised at Breslau in Germany. The old horse-trams have been put into service again and the fares for riding in these are given to the Winter Relief Fund. The normal service of electric trams is of course maintained.

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### GREAT WESTERN

"One of the pleasantest and most exclusive social events of the London year is the annual meeting of the Great Western Railway, held at Paddington on Wednesday.

"Sir Robert Horne has never been in wittier and more graceful form, we thought, and it was a splendid 'send-off' for the Coronation season. Some of the loveliest shareholders in London Society were present, including several débutantes-to-be, whose sparkling eyes and flushed cheeks were sufficient indication of their enjoyment of the function.

"We were glad to hear, incidentally, that Tabouche, the popular Great Western chef—his gracious, merry face is well known to travelling epicures as he bows his way along every G.W.R. restaurant-car, inquiring if the Mousse de Langouste Chambéry and the Hofberger Jesuitengarten Anlese Träumerei-Schafskopf '23 were to his guests liking—is now entirely recovered. Composing a special dinner for the Gourmets' Club on the Paddington-Bristol express some weeks ago, he cut his face on a salmon-tin."—*Timothy Shy in the "News-Chronicle."*

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### RAILWAY GOLD MINING

The South Manchuria Railway Company is planning to establish a new company, named the Manchu Mining Company, with a view to gold-mining operations in Jehol (Manchukuo). According to the Domei Agency, it has already reached an understanding with the Kwangtung (Japanese) Army and the Japanese Government in connection with the venture. The capital of the new company will be 10,000,000 yen (about £600,000), states Reuters, and all the shares will be taken up by the South Manchuria Railway.

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In 1847 there was a singular accident near Rugby. The contemporary account of this accident illustrates the practice in vogue at that time among the aristocracy, of journeying by rail in their own road carriages. It is as follows: "The Countess of Zetland was travelling with her maid in her private carriage attached to the train. They had put up an umbrella, which caught fire from a spark, and presently the upper part of the carriage was in a blaze. Her ladyship and the maid descended from the carriage to the truck, and the maid fell off and was injured. Lady Zetland rode on to

Rugby, and was uninjured; an engine was sent to pick up the maid, who was taken to Leicester Infirmary."

\* \* \*

### TRAVELLING CINEMA INNOVATION

An innovation recently introduced in the L.N.E.R./Pathe travelling cinema coaches which are available for passengers on certain trains between King's Cross and Leeds and between Leeds and Edinburgh, is a special "signature" film with suitable sound accompaniment. This film is used at the beginning of every performance and serves as an introduction. In the background are four of the latest L.N.E.R. locomotives in line, three of them of the streamlined type. They advance on the screen towards the audience until the reflection becomes a very impressive close-up of the locomotives. Then the performance proper begins.

\* \* \*

An unfamiliar glimpse of George Stephenson may be found in the biography of Mrs. Francis Kemble Butler (who was a daughter of John Kemble, the famous actor), where she tells in a realistic and vivid manner of her introduction to Stephenson, and gives an account of a ride she had on the newly-opened Liverpool & Manchester Railway. Under the date August 25, 1830, she writes: "While we were acting at Liverpool, an experimental trip was proposed upon the line of railway which was being constructed between Liverpool and Manchester. My father knew several gentlemen interested in the undertaking, and Stephenson having proposed a trial trip as far as the 15-mile viaduct, they, with infinite kindness, invited him and permitted me to accompany them; allowing me, moreover, the place which I felt to be one of supreme honour, by the side of Stephenson. All that wonderful history, which Mr. Smiles' biography of the projector has given to the world, I then heard from his own lips. He was rather a stern-featured man, with a dark and deeply-marked countenance; his speech was strongly inflected with his native Northumbrian accent, but the fascination of that story told by himself, while his tame dragon flew panting along the iron pathway, surpassed the first reading of the Arabian Nights, the incidents of which it almost seemed to recall. He was wonderfully condescending and kind, in answering all the questions of my eager ignorance, and I listened with sympathetic enthusiasm, as he told me of all his alternations of hope and fear, of his many trials and disappointments, related with fine scorn, how the 'Parliament men' had badgered and baffled him with their book-knowledge, and how when at last they had smothered the irrepressible prophecy of his genius in the quaking depths of Chat Moss, he had exclaimed, 'Did ye ever see a road

Down with damage and delay!!  
They destroy dependability on which our  
reputation and livelihood depend.

**Make it your  
pride that Goods  
do not fall—  
then Revenue  
will rise.**

No. 3 of a new series—the third—of  
"claims prevention" posters issued by  
the Chief Goods Manager, G.W.R.,  
for exhibition to the staff

float upon water? I will make my road float upon Chat Moss!' The well-read Parliament men (some of whom, perhaps, wished for no railways near their parks) could not believe the miracle, but the shrewd Liverpool merchants helped to their faith by a great vision of immense gain, did; and so the railroad was made, and I took the memorable ride by the side of its maker, and would not have exchanged the honour of it for one of the shares in the speculation."

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### THE ORIGIN OF SUPERANNUATION

When the Conference of Goods Managers at the Railway Clearing House, London, on January 26, 1860, resolved itself into a special meeting for the consideration of a proposal by Mr. Walklate, the Goods Manager of the Midland Railway Company, it was perhaps hardly realised that this was the first step towards the establishment of railway superannuation funds. The resolution adopted at this historic meeting was: "RESOLVED—That it is highly expedient to take immediate steps to provide, for the benefit of railway officers and their dependants, funds for granting superannuation allowances, annuities to widows, and for making arrangements for enabling the members of these funds to effect insurances on the most favourable terms; and that a committee be appointed to confer with the Clearing House to ascertain the best mode of accomplishing these desirable objects; and further, that the superintendents be invited to appoint a committee to co-operate with that now nominated."

## OVERSEAS RAILWAY AFFAIRS

(From our special correspondents)

### SOUTH AFRICA

#### Suggested Tourist Ministry

The Standing Advisory Committee of the South African National Publicity Association expressed the view at a recent meeting in Cape Town, that, if South Africa was to realise her excellent prospects for tourist industry and development, it would be necessary to place the conduct of national tourist promotion and propaganda in the hands of an organisation separate from the present railway control. The committee strongly recommended the establishment of a Ministry of Tourism, provided the State was prepared to allot adequate funds for such a department; the sum they had in mind as a minimum was £50,000 per annum. This portfolio might appropriately and effectively be combined with that for transport in the event of Parliament deciding to establish such a Ministry. The Minister of Railways and Harbours has been asked to receive a deputation to discuss the matter.

A further resolution adopted by the committee was that an area of approximately 19,000 morgen of land between the Limpopo and Pafuri rivers should be added to the Kruger National Park. In discussing this resolution, reference was made to a suggestion by General Smuts at the recent South Africa Transport Conference, that the Governments concerned should each create game reserves extending over a total of two thousand miles. The committee also decided to request the Government to provide a special grant of £20,000 a year, for ten consecutive years, to the National Parks Board of Trustees, for the improvement and development of South African national parks.

#### Railway Health Service

In his annual report for 1935-36, the Assistant Health Officer for the Union states that not more than three years ago the policy of the gradual extension of the South African Railways and Harbours health organisation from one which dealt with the control of malaria on two out of the nine systems comprising the South African Railways, to one embracing all phases of health work on all systems, was embarked upon. The policy of training men in the service, or juniors joining the service, in the wider aspects of the work has been maintained.

It was realised that the "leavening" process upon which the organisation embarked in transferring the pioneer members of the staff, as they qualified, to initiate the work on systems further afield, would be a slow one, and it was feared that malaria control would suffer as a result. Time has, however, shown a constant reduction of malaria each year and, in spite of the fact that at

the beginning of the year the organisation had been completed on only three systems, at the end of the year there was a complement of staff with a qualified health inspector or assistant health inspector in charge of four additional systems.

In the early stages, when trained men were not available, the field work was supervised directly by the Assistant Health Officer, but a policy of decentralisation was decided upon, so that each Health Inspector, with the field staff he controls, is now part and parcel of the system railway organisation. The Health Inspector or Assistant Health Inspector in charge of each system now works in direct contact with the System Engineer, to whom he makes requests for structural improvements entailed in the carrying out of health and hygiene projects, and for financial provision for betterment. In addition to reports on special investigations and weekly summaries of executive work undertaken in the field, each Health Inspector submits a monthly report to the Assistant Health Officer for the Union on standardised lines. The organisation has developed a closer relationship with the railway curative service by arrangement with the Sick Fund, and a system of advice of all notifiable diseases amongst railwaymen and their dependants has been arranged.

Among the routine duties which are being regularly carried out are the sampling and protection of domestic water supplies; rodent disinfestation of stations and premises; disinfestation of traffic material offering rodent or flea harbourage at railheads where plague has been discovered; supervision of night soil and rubbish disposal methods,

and of waste water disposal at quarters; disinfection and disinfestation measures for infectious disease at quarters and on other premises; supervision of residential premises sanitation; and factory hygiene at workshops; and the carrying out of malaria measures in affected areas. The number of men booked off duty with malaria has been reduced from 1,021 in 1932 to 84 in 1935.

### RHODESIA

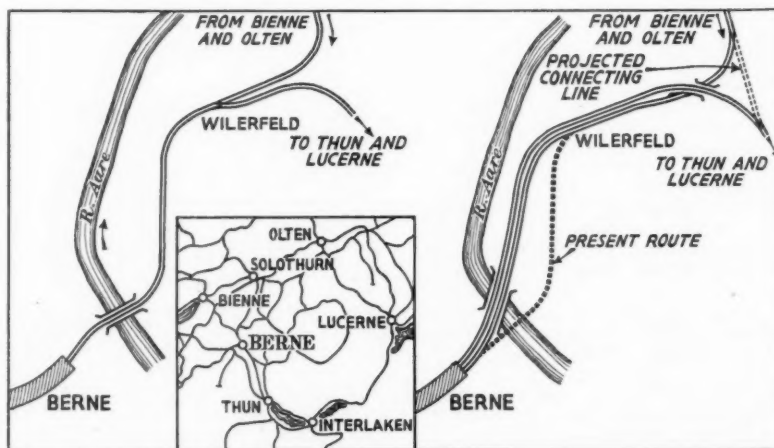
#### De Luxe Train Beds

The Rhodesia Railways have followed the South African Railways in introducing a "de luxe" train bed for their passengers, who desire a greater standard of comfort to enable them to sleep soundly on a rail journey. This bed consists of a special mattress laid on the seat, which forms the normal bunk mattress, together with the usual standard train bedding of two pillows, two sheets and three blankets. An extra fee of 4s. 6d. per journey is made for the mattress, and it is understood that, despite the extra charge, the de luxe bed is gaining favour with light sleepers.

### SWITZERLAND

#### Berne-Wilerfeld Deviation and Quadrupling

Contracts for the Berne-Wilerfeld four-track deviation (referred to in the November 13, 1936, issue of THE RAILWAY GAZETTE, p. 784) were confirmed and will be placed as follows: Viaduct over the Talwegmulde; Heinrich Hatt-Haller A.G., Zurich; Keller & Company, Berne; and A. Marbach, Berne. Aare bridge and approach viaducts: Hans Kästli, Berne; Locher & Co., Zurich; F. Ramseier & Co., Berne; and Kurt Rieser A.G., Berne. The realignment and improved facilities are shown in the accompanying sketch plans. The contract for the first por-



Berne-Wilerfeld deviation. Inset: Key map of lines radiating from Berne. Left: Berne-Wilerfeld lines as at present in use. Right: Lines as now being realigned and quadrupled



tion of this important work, a cutting near Wilerfeld, was let in November.

#### New Season Tickets

A new type of season ticket introduced by the Federal Railways on February 1 entitles the holder to 10 return trips between two given stations, to be made within a month. The average fare reduction is about 50 per cent. It is hoped that these new tickets will soon become popular among persons travelling frequently but not daily between two towns, or from town or country, or *vice versa*, thus attracting new traffic to the railway.

#### Improvements in January

Most of the private lines concerned with winter sports traffic have reported considerable increases in passenger movements during January, 1937, foreign visitors being particularly numerous, and the February results also have so far been very satisfactory. The Federal Railways frequently had to run expresses in two sections on several lines, and their figures continued to improve in January, as the following comparative data show:—

	January, 1936	January, 1937
Passengers carried ...	9,080,000	9,587,000
Passenger receipts Fr.	8,928,000	9,399,000
Freight carried Tonnes	857,321	1,121,481
Freight receipts... Fr.	10,297,000	13,044,000
Total receipts ...	20,255,000	23,592,000
Working expenditure ... Fr.	17,339,000	16,553,000
	2,916,000	7,039,000

#### New Snow Plough on the Jungfrau

In order to maintain a regular service over its line throughout the winter, the Jungfrau Railway recently acquired a rotary snow plough to clear the Scheidegg-Eigerletscher section, on which the snow attains a considerable depth and can be cleared only by manual labour after several days' work. From Eigerletscher to the terminus at Jungfraujoch (Europe's highest station) the line is in tunnel. The famous Berghaus at Jungfraujoch and the tourist hotel will in future be opened all winter, and the Alpine Research station of Geneva University will also be accessible throughout the year.

The new snow plough, which weighs 14 tonnes, has to be propelled by an ordinary electric locomotive, as its two motors (developing 150-250 h.p.) only serve to drive the two rotary ploughs. At an angle of 55 deg. the latter can throw the snow to a height of about 5 m. and a distance of 14 m., either left or right as desired, and are capable of clearing some 150 cu. m. of snow a minute. The body of the plough can be swung round on the underframe so as to act on the downward as well as on the upward journey if necessary. The electrical equipment of the vehicle was supplied by Oerlikon and the mechanical parts by the Swiss Locomotive & Machine Works, Winterthur.

The Jungfrau Railway is a metre-gauge line, 9.3 km. in length, equipped with the Strub rack for a distance of

6.5 km. and using three-phase current at 650 V., 40 cycles. The first portion of the line was opened in 1898 and the last in 1912.

## THE FAR EAST

#### Extension to Chiamussu Opened

On January 15 the 135-km. Poli-Chiamussu extension of the Manchukuo State Railways was opened to provisional traffic, thus completing a 580 km. line from Tumen northwards to Chiamussu on the Sungari River. This is one of several long tentacles of the Manchukuo railway system stretching out northwards towards the U.S.S.R. frontier on the Amur River.

#### Better Communications between China and Manchukuo

February 1 marked the beginning of a new era in the history of China and Manchukuo, as on that date two express services each way daily were inaugurated between Peiping and Mukden. A super express now covers the intervening 841 km. (521 miles) in 15 hr. 0 min. westwards and 16 hr. 40 min. eastwards, with stops of 40 min. and 35 min. at Shan-hai-kwan and 10 min. and 20 min. at Tientsin. The previous best time was 19 hr. Arrangements have also been made to connect these trains with expresses to Dairen and the Hikari and Nozomi expresses between Manchukuo and Korea. Thus Tokyo can be reached in 66 hr. from Peiping, the distance by land and sea being 3,300 km.

## ITALY

#### Cheap Short Season Tickets

Visitors to Italy, holding travellers' cheques, letters of credit, hotel, or tourist service coupons, are entitled to specially reduced short season tickets. These can be booked either abroad or at the Italian frontier, and the fares chargeable are shown in table below. The remarkable points about these tickets are that (1) they can be used anywhere throughout the Italian State

	6-day				15-day			
	Lire	£	s.	d.	Lire	£	s.	d.
First class ...	240	=	2	6 8	530	=	5	2 11
Second „ ...	170	=	1	13 0	360	=	3	9 11
Third „ ...	100	=	0	19 5	210	=	2	0 10

Railways system, for as many journeys as the holder wishes, within the period prescribed; (2) they are available on all trains including *rapides* and the *Littorine* express railcars without payment of any supplement; (3) they can be paid for in foreign currency at special tourist exchange rates fixed at 103.2 lire to the £1 (at which rate the above equivalents are calculated); (4) these short seasons can be extended to double the period on payment of a supplement of either lire 40, 30 or 20, according to whether they are first, second, or third class; for each day of extension (which can be granted at any station, once or twice); and (5) holders can book an unlimited number of sup-

plementary tickets, single or return, at 50 per cent. reduced rates, within 60 days of the issue of their short seasons even after these have expired.

#### Other Attractions to Tourists

The 70 per cent. reduced fares on second and third class 30-day return tickets from frontier stations for honeymoon couples, are available also for golden and silver wedding anniversary journeys in Italy; the frontiers of entry and exit need not be the same.

A 25 per cent. reduction in the costs of sleeping car supplements is allowed to parties of six visitors from abroad if they are for return journeys, or to parties of eight for single journeys.

## CANADA

#### Transport Commission Bill

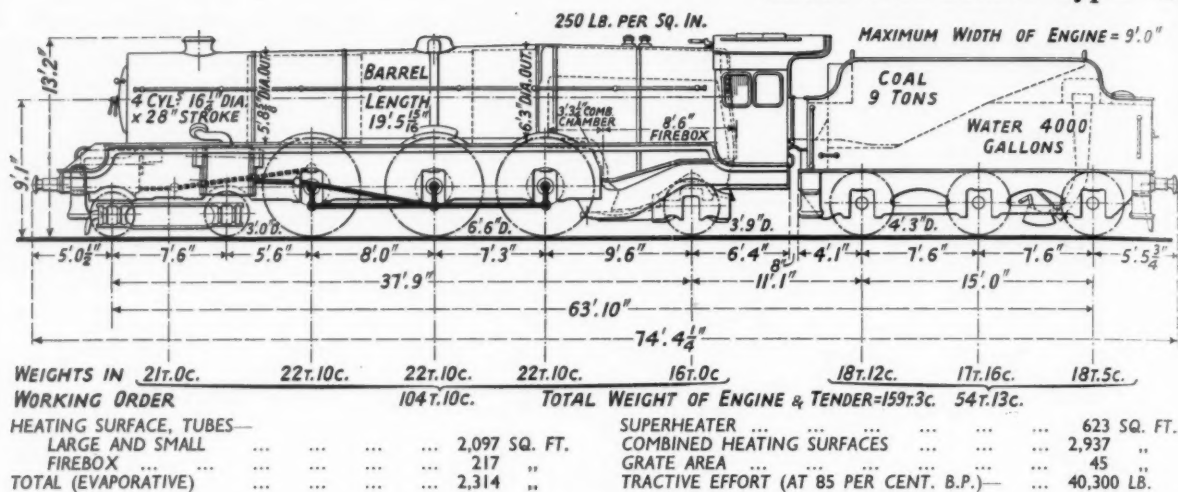
Mr. C. D. Howe, Minister of Transport, addressing the Parliamentary Railway Committee of the Senate in explanation of the Bill creating a Transport Commission out of the Railway Commission, said: "I am convinced that the time has come when either we must do away with regulation of the railways or else apply regulation to all branches of transport." Any suggestion of the Bill being sponsored by the railways was denied by the Minister. He recalled that when the Railway Commission was created, the railways largely monopolised transport, whereas today they carried less than 50 per cent. of the freight and passengers of the Dominion. Because of the changed conditions either general regulations or none at all were, he said, necessary. The measure would not apply to coastwise shipping on either ocean, but applied essentially to traffic from Montreal to the head of the Lakes. Mr. Howe emphasised: "We do not look for any increase in rates by water, but rather their stabilisation."

#### Protection and Elimination of Level Crossings

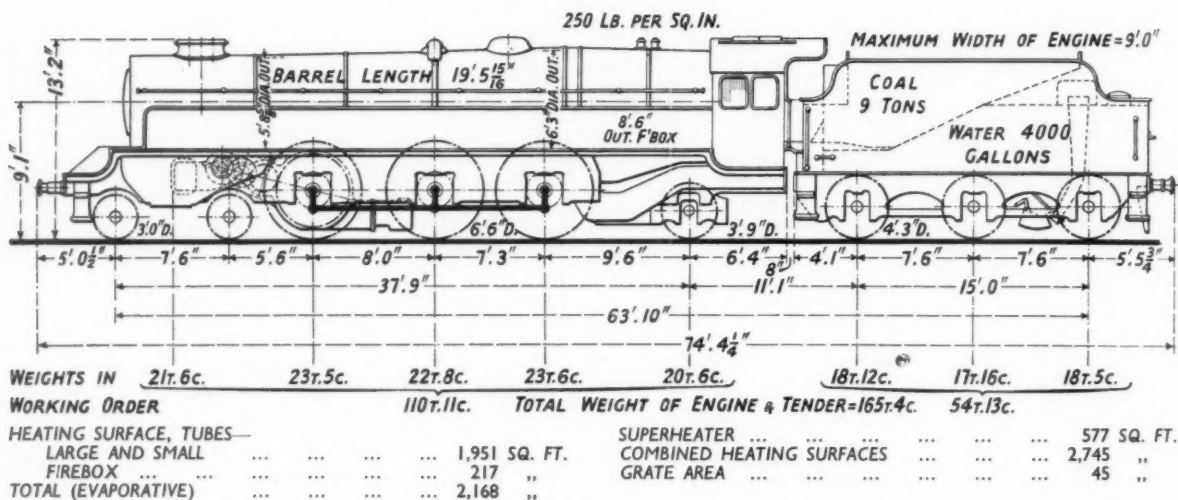
A report of the Board of Railway Commissioners tabled in the House of Commons disclosed that, of the \$1,200,000 made available to the Board of Railway Commissioners last year for the elimination and protection of level crossings, \$646,305 has already been expended. A number of projects are under consideration and will use up the remainder. During 1936 there were installed 150 bells and wigwags; 15 wigwags; 26 bridges, and 16 road overbridges; also 75 level crossings were closed; and 31 roads were diverted.

Last year 333 persons were killed in railway accidents and 2,972 injured. The killed, compared with the corresponding figures for 1935 in brackets, were as follow: Passengers, three (nine); employees, 70 (50); others, 129 (126); trespassers, 122 (130). Level crossing accidents last year killed 113 persons and injured 367.

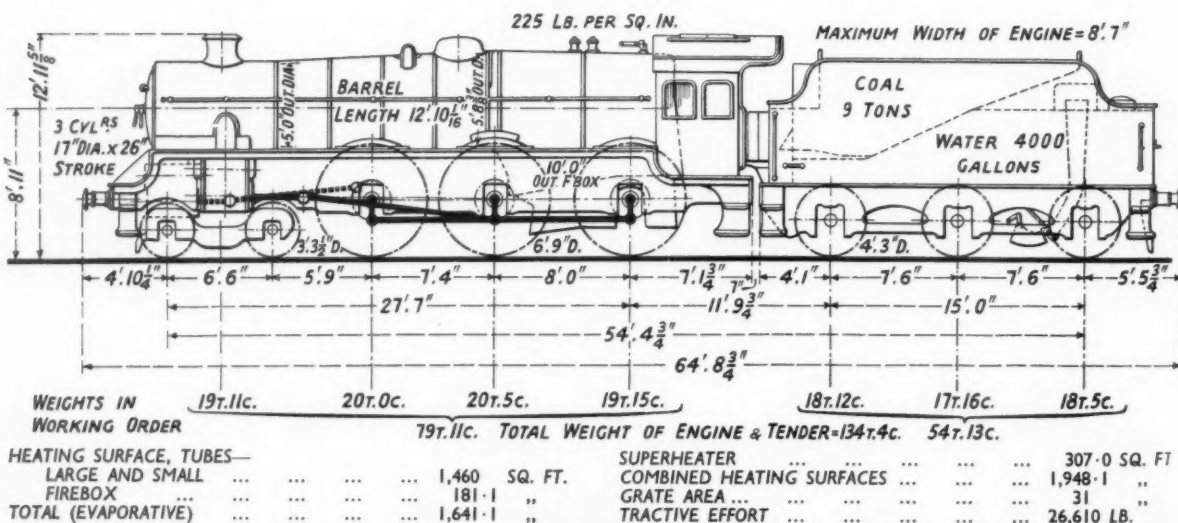
## British Locomotive Types—IV



7P Class "Princess Royal"

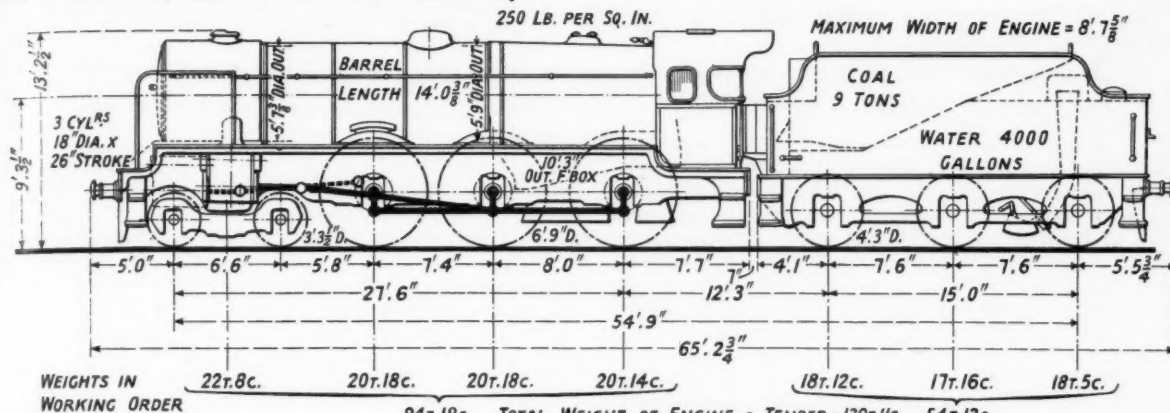


Turbine Locomotive



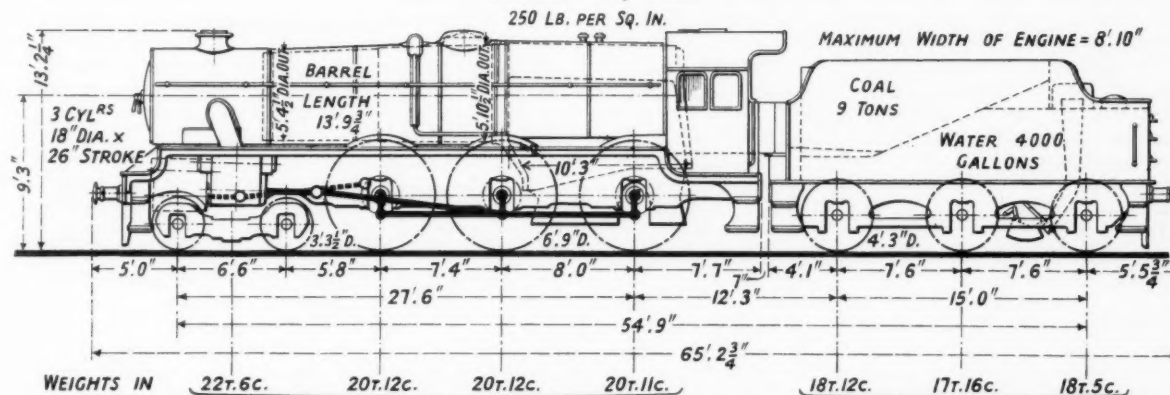
5XP Class "Silver Jubilee"

## London Midland &amp; Scottish Railway



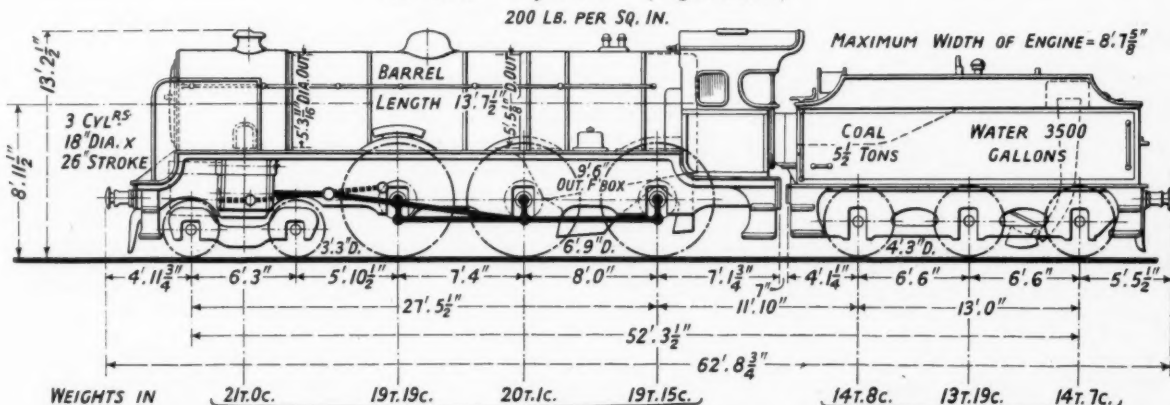
HEATING SURFACE, TUBES—				SUPERHEATER	399.0 SQ. FT.
LARGE AND SMALL	...	...	1,892.0 SQ. FT.	COMBINED HEATING SURFACES	2,480.0 "
FIREBOX	...	...	189.0 "	GRATE AREA	31.2 "
TOTAL (EVAPORATIVE)	...	...	2,081.0 "	TRACTION EFFORT (AT 85 PER CENT. B.P.)	33,150 LB.

6P Class "Royal Scot"



HEATING SURFACE, TUBES—				SUPERHEATER	360.0 SQ. FT.
LARGE AND SMALL	...	...	1,669.0 SQ. FT.	COMBINED HEATING SURFACES	2,224.0 "
FIREBOX	...	...	195.0 "	GRATE AREA	31.25 "
TOTAL (EVAPORATIVE)	...	...	1,864.0 "	TRACTION EFFORT (AT 85 PER CENT. B.P.)	33,150 LB.

6P Class "Royal Scot" (Taper Boiler)



HEATING SURFACE, TUBES—				SUPERHEATER	365.0 SQ. FT.
LARGE AND SMALL	...	...	1,450.0 SQ. FT.	COMBINED HEATING SURFACES	1,998.0 "
FIREBOX	...	...	183.0 "	GRATE AREA	30.5 "
TOTAL (EVAPORATIVE)	...	...	1,633.0 "	TRACTION EFFORT (AT 85 PER CENT. B.P.)	26,520 LB.

5XP Class "Patriot"



## THE CHIEN TANG BRIDGE, CHINA

*A rail-cum-road structure seven-eighths of a mile long, with foundations carried down to a maximum depth of 230 ft. below the roadway, and 150 ft. below river bed*

**T**HIS important bridge, which is now nearing completion, occupies a strategic position in the chain of railway communications in Eastern China. Situated about  $4\frac{1}{2}$  miles south of the city of Hangchow, capital of the Province of Chekiang and a large business centre, it will not only link up the isolated Shaoshing-Ningpo section with the remainder of the Shanghai-Hangchow-Ningpo Railway, but will also permit of through running over that line to the Chekiang-Kiangsi Railway, which will soon be connected in turn with the Canton-Hankow line. Thus Shanghai and Canton will have a through train service, made possible by the completion of this bridge over the head of the funnel-shaped estuary of the Chien Tang, notorious for its bores, and already crossed by some 20,000 people daily, using the ferry.

### Cost and Contractors

The estimated cost of the bridge and its approaches was \$5,000,000, of which the Ministry of Railways of the Central Government in Nanking provided \$3,500,000, and the Chekiang Provincial Government \$1,500,000, raised through a banking group represented by the National Commercial Bank of Chekiang. Chekiang also owns the Chekiang-Kiangsi Railway, one of the participating railways. The contract for the steelwork of the main spans was let to Dorman Long & Co. Ltd., and that for the main piers and foundations to Aage Corrit; the approaches are being built by Chinese contractors, using German-fabricated steelwork.

The total length of the bridge is 1,400 m., or just under 4,600 ft. (say  $\frac{3}{4}$  mile). There are 16 spans each of 67 m. (220 ft.) over the main channel, and the approaches measure (north) 235 m.—including three steel arches carrying the roadway over the railway, which is on an embankment—and similarly (south) 92 m. with one steel arch. The main spans are double-decked, square-ended Warren trusses, carrying a 20-ft. roadway and two 5-ft. 6-in. footways on the upper deck, and a single line of standard-gauge railway on the lower. A headway of 29 ft. 6 in. above mean water level is allowed, and the railway approaches are graded at 1 in 300, while those for the roadway are at 1 in 25.

The main girders are spaced at 20-ft. centres and are 35 ft. deep. They were fabricated in England, of high-tensile chromium copper steel for the main part, though the bearing stringers were fabricated in Shanghai. The spans were erected on wooden jetties near by, floated out on pontoons and jacked up, and, with the help of the tide, placed on the piers. The steel arched spans in the approaches were supplied by the Siemens China Company, and fabricated in Germany.

### Piers and Foundations

The river bed is of silt and sand overlying a bed of rock which slopes downwards from north to south until it is all but 150 ft. below the river bed; this is equivalent to 230 ft. below the roadway decking. Consequently the concrete caisson foundations, though sunk through the sand to the rock under the six northern piers, have had to be founded upon piles throughout the remainder of the bridge. In the case of the southern piers, each caisson rests on a cluster of 160 piles, and each pile is up to about 100 ft. in length. Shorter reinforced concrete piles are used under the shallowest pile-supported pier. To drive the piles down some 40 ft. below river bed, "followers" were used and then withdrawn; this enabled the caissons to be sunk 40 ft. or more through the silt, so as to be well below scour level. The caissons measure approximately 60 ft.  $\times$  40 ft.  $\times$  20 ft. in height, and were floated out and sunk at site, in the usual manner.

The contracts for the work were signed between November, 1934, and February, 1935, and it is hoped that the bridge will be finished by June next. Like the construction of the Canton-Hankow Railway, already described in these pages, and of the great mileage of other new lines throughout the country, this bridge speaks volumes for the enterprise of the Chinese Ministry of Railways and of the individual railway administrations. Nowhere else in the world is a programme of 1,000 miles of new line a year proposed, especially as it includes even greater bridges over the Yangtze and Yellow rivers, and is being very largely financed, supervised and constructed by the Chinese themselves. We are indebted to the Quarterly Review of Chinese Railways for these particulars.

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### Single Line Working in Scotland

An article in the January issue of the L.M.S.R. journal *On Time* gives the amount of single line in the Northern Division of that railway as about 1,100 miles out of a total route mileage of 2,000, and although traffic is light on many sections there are others, such as the old Highland main line, where heavy and intensive passenger traffic is handled in the summer season. Another such line is the Callander and Oban, while the Girvan and Challoch Junction, and Castle Douglas and Stranraer lines, are used by the Larne boat train services. Most of the sections are worked by electric token instruments, the earliest form of which, the tablet system, was introduced on the Caledonian Railway, now part of the L.M.S.R., in 1878 by Edward Tyer. Others, of course, now exist, but the fundamental idea remains the same. The plain train staff, however, is used on some sections of very light traffic, or occasionally, as on the Thurso branch, at certain intervals

only. The wide variations in train services make special switching apparatus desirable, to give long or short section working to suit circumstances, as on the Stranraer line, and some of its earliest examples were installed many years ago on the Highland Railway. Of recent years many special schemes have been devised to reduce expenses. The Cairn Valley line was fitted with Sykes' single-line lock-and-block in 1905, where it is still in use. The L.N.E.R. also has a good deal of single line in Scotland, as on the Great North of Scotland, and West Highland sections, and has adopted switching apparatus in many places. The Lothians goods lines near Edinburgh, opened in 1915, were fitted with Sykes' single-line block, and the Brunstane Park signal box was peculiar in controlling a junction of four single lines without a passing loop, necessitating special locking arrangements to prevent more than three trains being accepted together.

## THE WALTON TRAINING SCHOOL, NORTH WESTERN RAILWAY, INDIA

*A review of the objects and scope of the school, which is both for students, probationers and apprentices, and also for the staff in various grades of seven departments of the railway, who have to pass periodical examinations there for promotion; it is, moreover, for refresher courses for the staff*

By V. L. DEAN, V.D., M.Inst.T.,

*Lately Principal of the school and now appointed Resident Manager, Indian Railways Bureau, New York*

**A** PROPOS of the notices regarding the L.M.S.R. Staff College at Derby that I have perused recently in THE RAILWAY GAZETTE since my arrival in this country from India, en route to New York, to take over the post of Resident Manager, Indian Railway Bureau, New York, I think it may be of interest to write a small note giving some details of the Walton Training School.\*

Prior to 1924 there was no recognised or hard and fast system of training recruits for the railway service or for giving technical and advanced instruction to staff to fit them for further promotion in the service. But when the divisional reorganisation scheme was introduced in 1925, it was decided to have a transportation school at Lyallpur for the training of signallers and the more junior members of the Transportation Branch. From the experience gained at this school, it was considered necessary to extend training facilities to other branches of the service, and as there was not sufficient accommodation in the existing buildings at Lyallpur, it was decided to build a new school at Kot Lakpat, near Lahore.

The school estate consists of 100 acres, and contains the main school buildings, quarters for the instructional and school staff, and hostels with accommodation for boarding 350 students, complete with kitchens and conveniences; there are tube wells with electric pumps for the supply of water for domestic and irrigation purposes, and an electric transformer for lighting and power. Twenty-five acres of land are set aside for use as sports grounds. The school now provides the North Western Railway with the most up-to-date railway training school in India.

### Model and Demonstration Rooms

The main school building consists of lecture rooms and model rooms for practical instruction in the various subjects. The transportation model room is equipped with over 400 ft. of 2½-in. gauge track, electrically operated, consisting of both single and double line track, 16 stations and 21 signal cabins, representing in miniature the various types existing on the open line. There are 13 stations worked under the different classes of working provided for in the General Rules for Indian Railways and absolute block regulations, and these are equipped with full sized block instruments at which 25 students can work in this model room at the same time.

The locomotive, carriage and wagon, and telegraph rooms are well equipped with a full range of models, including a complete set of vacuum gear fittings, valve setting models, various types of ejectors, a condemned engine, side cut to expose the interior fittings, a wagon frame, and also a complete wagon showing the various deficiencies which take place due to wear and tear, and which the Indian railways are required to repair or replace in order to comply with the foreign interchange rules under the Indian Railway Conference Association.

To meet the needs of way and works apprentices, per-

manent way inspectors, and others, the school has been provided with various types of rails, crossings, instruments and permanent way equipment enabling students to obtain a thorough and practical training in the correct methods of track construction. These are also used for the training of probationer and student engineers.

Similarly, in the case of commercial staff, the coaching and goods lecture rooms are equipped as model booking offices and goods offices so that the staff can be taught the practical commercial work side by side with the theoretical instruction imparted in the lecture rooms.

### The Objects of the School

The Walton Training School has two chief functions, namely, (1) the training of new recruits for the service, for which a complete syllabus of training courses is provided for the various categories, ranging from five to ten months' duration, as is explained below, and (2) a number of refresher courses for the purpose of giving higher instruction to selected staff for promotion to the more responsible subordinate positions on the railways. These refresher courses are from 6 weeks' to 4 months' duration. In addition, since the closing down of Dehra Dun Railway Staff College, the school controls the training of probationary officers. Junior officers are given instruction in the school and their subsequent training on the open line is controlled by the school throughout the period of their probation. During the year approximately 1,500 students of all categories pass through the school.

Special care is taken to select only the best men for appointments as instructors at the school. Those members of the railway staff who are selected for instructors' posts have to attend a special course at the school, and only those who qualify with distinction, who at the same time possess the aptitude for imparting knowledge to others, and are likely to become good lecturers, are selected. Members of the school staff are permitted to retain instructors' posts for a period of three years, with a yearly extension up to a maximum of six years, subject to their work and results continuing to be satisfactory.

It is noteworthy that the school assists the railway headquarters in questions arising out of the general and subsidiary rules and station working rules. Also in view of the serious question of road and rail competition in India and the formation of a new organisation at headquarters to deal with this subject, a special course has recently been introduced in the school to give instruction in this subject, to which selected senior members of the commercial staff are nominated to attend. This particular course is of two months' duration.

The scope of this institution has now been extended so as to embrace all the important categories of staff on the railway, and the beneficial results of refresher courses for those already in service are becoming more marked as the number passing through the school increases. The activities of the school are undoubtedly of great advantage

\* Also referred to in an editorial on page 408.

to the administration in improving the efficiency of operation. Some further details of the various courses provided and conditions prevailing at the school may be of interest and are therefore given below.

#### Administration and Staff

The Walton Training School, named after the Agent (or General Manager) of the N.W.R., who was responsible for its conception and building, Col. Sir Cusack Walton, late R.E., is under a board of direction consisting of heads or certain deputy heads of the various departments, responsible to the Agent of the railway. The school staff consists of a Superintendent—usually a senior divisional officer—and 19 instructors. These are transportation instructors (3); coaching instructors (3); goods instructors (2); mechanical instructor (1); block instructor (1); telegraph instructors (5); train examiner instructor (1); and permanent way instructors (3). There are also a sub-assistant surgeon, an assistant staff warden and a staff of clerks on the establishment of the school.

#### Welfare and Relaxation

All students are catered for in the several messes. There are separate messes for the senior staff of the various communities, *e.g.*, for Europeans, for Mahomedans and for Sikhs and for the various Hindu castes, and each is self-administered and organised. So much per head per day is allowed for catering to each mess, which elects its own mess president and secretary; provided they keep within the capitation allowance and behave themselves, the messes are allowed to run themselves to the satisfaction of the members of the messes. In the 25-acre recreation grounds, games are strongly encouraged, while physical exercises and games are compulsory for young students, probationers, and apprentices.

#### Selection for and Conditions of Entry into the School

The objects of the school are to provide training for probationer officers, apprentices and students prior to appointment, and for employees already in service. Admission into the school for attendance in the various courses is from (1) probationer officers, nominated by the Agent of the railway, (2) candidates for recruitment fulfilling conditions governing recruitment to the N.W.R., (3) members of the staff already in employment nominated by a competent authority, and (4) members of the staff due refresher courses nominated by the Superintendent of the school in rotation according to their service. Students under training as new recruits have to pay a deposit, that may be forfeited for misconduct of any kind, or, in some cases, failure to pass prescribed examinations within the normal periods. Each student or apprentice must sign an agreement bond on entering the school.

#### The Courses Provided

Of the two main categories of courses, "T" Training and "R" Refresher, the former is subdivided into two sections, (1) for commercial and transportation students and (2) for permanent way, signal and interlocking and bridge subordinates and apprentices. Section (1) is again divided into four groups, (a) the stationmasters' group, to train men as signallers, assistant stationmasters and stationmasters; (b) the commercial group, for goods, booking, luggage and parcel clerks; (c) probationary guards and (d) boy-firemen.

The following are the qualifications for and periods of the courses, group by group:—

##### Section 1

All candidates for employment in groups (a), (b), and (d) must have passed the Matriculation Examination of a recognised university and secured first or second division. Junior Cambridge will be recognised as equivalent to these matricu-

lation standards. They also have to pass a medical board and a divisional selection board.

The stationmaster group training period is 10 months at the school and one month's practical experience at a large station. If not up to standard, students may have to undergo longer training. During their training students have to pass exams. in telegraphy, coaching, transportation, vacuum brake and first aid.

Commercial group students' period of training is six months, five at the school and one in practical work. They have to pass exams. in coaching, goods, rules, and first aid. The probationary guards' course is five weeks at the school and three weeks' practical training, and then a final examination. Boy-firemen, on completion of two years' training in locomotive running sheds, are required to attend a six-weeks' course at the school. Before the end of their third year's training they have to take another course and a final exam. Fixed pass-percentages are laid down for all exams. in all subjects.

##### Section 2

For recruitment as permanent way, &c., apprentices, the following qualifications are required: the same matriculation standard of education as above, sound and healthy constitution and possession of certificates of good character and for games from the principal of the last school or college attended. Additional evidence of practical experience as a smith, carpenter or fitter is required. The training is for a period of four years, of which 10 months in the first year and one month in the fourth year are spent at the school, in the case of permanent way apprentices. Bridge apprentices spend four months in the first year at the school; signal apprentices spend one month in their fourth year at the school. Bonuses are granted to students or apprentices attaining special proficiency.

Refresher courses are normally of four weeks' duration and are usually attended by employees nominated periodically after each five years' service. Employees found deficient in knowledge of working rules may be sent for special refresher courses. Failure to qualify in an exam. is not taken as conclusive proof that a man is totally unfit to work in a particular capacity. Messes for staff attending refresher courses are managed as for the junior students, except that they are fed free of charge.

#### The Scope of Courses

To give some idea of the scope of the various training and refresher courses, the following have been selected for mention here as being fairly representative:—

Course	Class of Students or Staff	No. of Courses held in School Session	Duration of each Course
T-1	Stationmasters' group students	2	10 months
T-2	Commercial group students	2	5 "
T-3	Probationary guards	1	2 "
T-4(a)	Boy-firemen due in school on completion of 24½ months' training in shed	2	1½ "
T-7	Assistant stationmasters and controllers to qualify for senior stationmasters and traffic inspectors	3	3 "
T-9	Probationer engineers and student engineers	1	42 days
T-10	Assistant way inspectors, Grade I, to qualify for appointment as permanent way inspectors	1	4 months
	(ii) For permanent way inspectors	1	4 "
T-11	Gangers, artisans, works clerks, timekeepers, etc., to qualify as assistant way inspectors, Grade I	2	5 "



Course	Class of Students or Staff	No. of Courses held in Session	Duration of Course
T-13	Drivers to qualify for loco. inspectors and loco. inspectors, fuel	1	2½ months
T-16	Block inspectors and assistant block inspectors	—	14 days
T-17	Bridge inspectors and assistant bridge inspectors	4	14 "
T-18	Senior commercial course for traffic inspectors, commercial supervisors, rates inspectors, traffic canvassers, all staff of Sales Branch, station masters, Grade I-IV, station commercial clerks, parcels clerks and goods clerks	6	6 weeks
T-19	For signalmen, pointsmen and cabinmen, &c., in the manipulation of block instruments to qualify as cabin assistants	—	3 to 4 weeks
R-1	Stationmasters' group ..	—	30 days
R-2	Commercial group (coaching) ..	—	30 "
R-3	Commercial group (goods) ..	—	30 "
R-4	Firemen .. ..	—	} Arranged as required
R-6	Shunters .. ..	—	
R-6	Drivers .. ..	—	
R-9	Train examiners .. ..	4	60 days
R-13	Transportation staff for renewal of block instrument competency certificates	—	2 to 6 days

From these extracts from the list of courses it will be seen that such courses as T-7, T-10, T-13, T-18 and T-19 are for comparatively senior men to enable them to qualify for promotion to the senior subordinate grades in various departments; T-9 is for probationer and student engineers, and T-11 for gangers and artisans. To give some idea of the ground covered by these courses specimen syllabi have been selected and are as follow:—

#### Training Course No. 1

For stationmasters' group students: Period—303 days or 1,214 working hours.

Subjects	Time allowed
(a) Telegraphy .. ..	804 hours
(b) Transportation (Practical) ..	} 108 "
(c) General and Subsidiary Rules ..	
(d) Commercial (Coaching) .. ..	214 "
(e) Vacuum .. ..	10 "
(f) Ambulance .. ..	30 "
Examination and tests .. ..	48 "
Total .. ..	1,214 "

#### SYLLABUS

- (a) *Telegraphy* :—  
 (i) Signalling and receiving in open and closed circuits at a rate of 18 words a minute. (ii) Methods of testing instruments at battery connections to localise faults. (iii) Knowledge of instruments & battery connections. (iv) Telegraph rules & rates.
- (b) *Transportation* :—  
 (i) Model-room demonstrations. (ii) Model-room practical.
- (c) *General and Subsidiary Rules* :—  
 (i) Rules, Part I. (ii) Safety First principles. (iii) Operating Manual (selected chapters).
- (d) *Commercial* :—  
 (i) Railway Audit and Accounts Code. (ii) Coaching Tariffs. (iii) Rules and Rates for Conveyance of Government Traffic. (iv) Explosives Pamphlet. (v) Commercial Manual.
- (e) *Vacuum* :—Simple (Cylinder).

#### Training Course No. 6

For assistant stationmasters recruited prior to 1926 to qualify for promotion to stationmasters' grade: Period—60 days, or 237 working hours.

Subjects	Time allowed
(a) General and Subsidiary Rules ..	} 85 hours.
(b) Transportation—Practical ..	
(c) Interlocking .. ..	2 "
(d) Traffic control .. ..	2 "
(e) Commercial duties (Goods) ..	89 "
(f) Telegraph (technical and signalling) ..	45 "
Examinations .. ..	14 "
Total .. ..	237 "

#### SYLLABUS

- (a) *General and Subsidiary Rules* :—  
 (b) *Transportation—Practical* :—  
 (i) Model-room, train passing and block instruments.  
 (ii) Working Rules accompanying timetables.  
 (iii) Operating Manual.
- (c) *Interlocking* :—  
 (i) Simple. (ii) List and Morse and improved.
- (d) *Traffic control* :—  
 (i) Responsibility. (ii) Co-operation. (iii) Passenger census.  
 (iv) Mela traffic. (v) Card indexing of stock.  
 (vi) Preparation of stock reports.
- (e) *Commercial (Goods)* :—  
 (i) Railway Audit and Accounts Code. (ii) Government traffic rules and rates. (iii) Goods traffic.  
 (iv) Commercial manual. Safety first principles.

#### Training Course No. 9

For Probationary and Student Engineers: Period—42 days or 186 working hours.

Subjects	Time allowed
(a) Visit to depot .. ..	6 hours
(b) Field .. ..	35 "
(c) Transportation .. ..	19 "
(d) Transportation—Practical ..	10 "
(e) First-aid .. ..	12 "
(f) Officer from Headquarters ..	6 "
(g) Permanent-way—Theory ..	48 "
(h) " " Practical .. ..	50 "
Total .. ..	186 "

#### SYLLABUS

- Formation*.—Dimensions, slopes, camber drainage, cuttings and banks.
- Ballast*.—Types, use, sizes, sources of supply, costs. Stacking, carriage, measurements, spreading. Depth and cross sections for different sleepers.
- Rails and fittings*.—Sections in use and where. Characteristics and interchangeability. Cut length and limits. Care of track materials, stacking, loading and unloading. Combination plates. (Officer from Headquarters deals with rails and their manufacture and design).
- Sleepers*.—Types in use, characteristics. Wood sleepers—types of wood for different purposes. Care in handling, stacking and use. Cost. Lift.
- Laying rails and sleepers*.—Methods. Distribution of labour. Tools and labour necessary. Preliminary arrangements. Levelling, packing, boxing, &c.
- Maintenance of track*.—Responsibilities and duties of the various grades of staff. Organisation of gangs, lengths, &c. Quantities of work per man. Check of work done as to quantity and quality. Records of progress of work. Use of the various tools. Straightening, removing sags. Common faults, causes and remedies. Annual programme for maintenance. Payment of labour, use of temporary layout, &c. Emphasis is laid on points usually neglected and on what to look for and how to prevent bad track developing.

7. *Curved track*.—Radius and degrees of curvature. Limiting radius. Lead of inner rails. Extra gauge. Spacing of sleepers. Staggering of joints. Maintenance of curves. Common faults.
8. *Creep*. 9. *Buckling*.
10. *Speed on curves and superelevation, &c.*—Taken by officer from headquarters.
11. *Transition curves*.—Taken by officer from headquarters.
12. *Points and Crossings*.—That which is not dealt with by the officer from headquarters.
13. *Gradients*.—Effect. Effect on superelevation. Ruling gradient. Compensation for curvature. Limiting gradients in certain emergent cases.
14. *Crossovers*.—That which is not dealt with by officer from headquarters. Parallel tracks, between curved tracks. With different angle crossings.
15. *Diamond and Scissors Crossings*. 16. *Double and Single Slips*
17. *Gathering Lines*. 18. *Three-throws*. 19. *Triangles of varying kinds*.
20. *Renewals*.—
  - (a) Inspection prior to framing programme.
  - (b) Records kept. Permanent way diagrams, &c.
  - (c) Renewal diagrams and their uses.
  - (d) Dismantling, labour and tools required.
  - (e) Stocking and care of fittings.
  - (f) Turning and changing rails in line.
  - (g) Programme of work.
  - (h) Particular points to watch.
21. *Hallade track recorder and its use*.—Taken by officer from headquarters.
22. *Accounts*.—R.M. Account; Tools and Plant Account; Petty Stores Account and Transferable Account.
23. *Supply of materials*.—Indents. Issue-notes. Advice-notes, &c.
24. *Imprests and their uses*.
25. *Breaches, diversions and other emergent problems*.
26. *Cribs, rail girders, &c.*

### Practical Work

1.—Probationer officers are fully trained in the use and proper handling of the various tools. They work as a gang and actually do packing, boxing, levelling, &c., of track with different kinds of sleepers. Whilst this is in hand, they become familiar with the different types of materials, both old and new. This also applies in the case of way and works apprentices.

2.—They do practical carpenter's and blacksmith's work, such as adzing sleepers, scarfing and splicing sleepers, rough welding of rods, cutting and drilling rails, &c. Whilst this is in hand particular emphasis is laid on the common errors in doing the work.

3.—They dismantle and assemble points and crossings and completely set out and lay a turnout, and, if possible, a crossover with fouling marks, &c.

Similarly, if possible, double or single slips.

4.—They also lay out curves with transitions. Both by instruments and offsets, and in addition,

5.—Fit various forms of creep anchors, switches, &c.

6.—In fact, every opportunity is taken to illustrate, as far as possible, practically in the field the matter dealt with in the lectures.

### Refresher Course No. 3

For Commercial Group (Goods)

Period—Thirty days. Course—122 hours.

Subjects	Time allowed
(a) Goods .. .. .	84 hours
(b) Commercial Manual .. .. .	20 "
(c) General Rules .. .. .	8 "
Examination .. .. .	10 "
Total .. .. .	122 "

- (a) *Goods*.—(i) Railway and Accounts Code; (ii) Goods Tariffs, Parts I and II; (iii) Dangerous Goods (Red Pamphlet); (iv) Conference Rules.
- (b) *Commercial Manual*.—All necessary chapters; Safety First Principles; General Rules.

### Refresher Course No. 6 (Locomotive)

For Drivers

Period—Thirty days or 122 working hours.

Subjects	Time allowed
(a) General and subsidiary rules .. .. .	40 hours
(b) Automatic vacuum-brake .. .. .	8 "
(c) Locomotive—	
(i) Injectors, safety valves and gauge columns	35 "
(ii) Lubricators, lubricants, and lubrication (including grease lubrication)	
(iii) Valve gears .. .. .	6 "
(d) Engine management and general knowledge of the locomotive .. .. .	6 "
(e) Accidents and engine failures .. .. .	5 "
(f) Ambulance—First-aid .. .. .	18 "
Examination .. .. .	10 "
Total .. .. .	122 "

### SYLLABUS

- (a) *General and Subsidiary Rules*.—
- (b) *Automatic Vacuum-Brake*.—
  - (i) Explanation of the working of the "Super-Dreadnought," "Dreadnought" and "C" types of ejectors.
  - (ii) "C" and "E" types vacuum cylinders, ball and release valves.
  - (iii) Drip-trap, relief valve and guard's-van valve.
  - (iv) Tests, and how to locate defects, and how to act when defects are located.
  - (v) General maintenance of the vacuum-brake ejector, cylinders and gearing.
- (c) *Locomotive*.—
  - (i) Locomotive boiler design in relation to steam generation.
  - (ii) Water, heat, steam, simple laws of combustion, causes of serious losses of coal on railways. Economical use of fuel.
  - (iii) Construction of Wakefield and Detroit types, mechanical and hydrostatic, explanation of the working of these lubricators.
  - (iv) Explanation of the working of the Furness type lubricator.
  - (v) Mineral and vegetable oils.
  - (vi) Flash points, viscosity, &c., why low grade oils should not be mixed with oils of a higher grade and why vegetable oils should not be used for lubricating the valves and pistons of superheated steam engines.
  - (vii) Trimmings and how to make and use them.
  - (viii) Stephenson's and Walschaert's gears are described in detail.
  - (ix) Lap and lead of valves.
- (d) *Engine Management and General Knowledge of the Locomotive*.—
  - (i) Relation of valves and pistons to big ends, side rods and eccentrics.
  - (ii) Travel of steam from the throttle to cylinders, its works in the cylinders and whilst being exhausted into the atmosphere.
  - (iii) Testing of valves and pistons.
  - (iv) Expansive working and its advantages.
  - (v) The importance of careful and systematic examination of the engine before, and after, the completion of every trip, and the need for accurate, clear and explicit booking of defects.
- (e) *Accidents and Engine Failures*.—
 

Action to be taken by driver in connection therewith.
- (f) *Ambulance*.—
 

First-aid. Safety First principles.

## MODERNISING GOODS DEPOTS ON THE L.M.S.R.

*The application to the handling of goods at depots of fundamental principles, established by exhaustive tests and analyses of existing practices, is effecting great savings in cost and time*

**S**ERVING as it does most of the important industrial areas of this country, the London Midland & Scottish Railway has to collect, convey and deliver daily an enormous volume of merchandise traffic through its 3,000 stations. The magnitude of this traffic may be realised from the following statistics of merchandise dealt with (excluding Classes 1 to 6) for the year 1936:—

Conveyed .. .. .	28,483,279 tons.
Handled at goods depots .. .. .	23,630,143 ..
Number of consignments handled .. .. .	111,617,983 ..

So far as handling is concerned, this involves the employment of approximately 17,600 men, and in addition about 11,250 men are employed on cartage work, utilising 7,000 horses and 2,300 motors. The foregoing involves an expenditure, including wages, maintenance and working costs of horses and motors, of about £5,000,000 per annum, a sum substantial enough to warrant every effort in eliminating waste and unnecessary movement.

The consignments that pass through a railway goods shed provide the greatest possible variety in shape, size and weight; and the goods sheds themselves, built by the individual companies prior to amalgamation, also have a great variety of design and layout, suitable for physical and other conditions of the site selected when they were built. The internal equipment of the sheds, too, such as cranes, turntables, capstans, hoists, and so on, have the same element of variety, which extends also to methods of operation due to differences in the layout and size of the sheds. As a result it is not surprising that the financial costs per ton (and the hours per ton) at the various stations bear no consistent relationship to each other, even between stations dealing with a similar volume of traffic.

### Preliminary Research

Considerable research work has recently been conducted by the L.M.S.R. with the object of bringing about improvements in the methods of handling goods, as well as some measure of standardisation both in shed design and work organisation. First principles, therefore, had to be discovered in order to ascertain whether improvement could be effected in methods, and also to what extent mechanisation might be of assistance. (1) To reduce the physical effort of the men and at the same time avoid unnecessary movement; (2) To concentrate the work as much as possible in order to reduce walking or barrowing distance, and to aid supervision; (3) To take the work to the men rather than that the men should go to the work; and (4) To eliminate trucking as much as possible.

It was expected that the practical application of these principles would go far towards greater efficiency in handling, and would also be of benefit in many other directions, such as: (a) Less handling would reduce claims for damage; (b) Quicker clearance of traffic would enable earlier deliveries and possibly later collections to be made; (c) Quicker release of wagons under load would lead to a more intensive use of rolling stock; and (d) Reduction of shunting costs by the adoption of other mechanical means.

Before much headway could be made, it was realised that altered methods would have to rest on the basis of facts, and that analyses or motion studies of all operations would have to be made to establish the facts and there-

after to fix standards which, with adjustment in particular circumstances, could be applied to the overall working results at all stations. The analyses obtained in the early stages of the investigation established that the variation in types of traffic between one station and another was not as material as was expected, and that where necessary it was practicable for suitable allowances to be made for this.

The ordinary method of transferring goods from one vehicle to another is by barrowing across a deck, and this may involve quite lengthy runs and very great variations in barrow loads; in fact the L.M.S.R. analysis showed such variations to range from 1 cwt. to 2½ cwt. a barrow. Further tests were made with the object of establishing whether barrowing might not be eliminated altogether in most circumstances, and it was found that in many places direct loading from wagon to dray and *vice versa* was both practicable and economical. In fact the cost of goods handling at small stations where little barrowing is necessary, and where direct loading is practised, was found often to be considerably less per ton than at big stations involving long barrow runs and much waiting about on the part of the staff.

Whilst the methods of handling inwards and outwards traffic differ in many respects, the essential components in each operation were capable of measurement, and although methods to be adopted for handling the two types of traffic might be different, the same degree of efficiency could be obtained in each case from the altered methods of working. Moreover, the operations on the shed deck could not be looked upon in the sense of a watertight-compartment operation, but had necessarily to be related to the further step of cartage operations in connection with the delivery or collection arrangements. It was found on enquiry that too often the deck operations and the cartage arrangement were not co-ordinated as they should have been, and that therefore there was scope for the establishment of better methods on the cartage side than had previously existed. To a certain extent, also, what might be termed yard working had to be brought into relationship with the shed and cartage operations as well, in the interests of all-round efficiency.

### Initial Application to Small Depots

It has been considered sound policy to begin by applying the principles established by the research work to the smaller stations, taking advantage of the experience gained at each successive stage, and so lead up gradually to the problems of the larger stations. Already about 150 of the smaller and medium stations have been overhauled. In many of the small depots it has been possible to apply the principles without structural alterations, but in a considerable number of cases some structural alteration was necessary, and already schemes have been authorised by the L.M.S.R. Board involving an expenditure of about £400,000 and the benefits and greater efficiency obtained well justify the extension of the methods to still further and larger depots.

The principles established by the job analyses were first of all applied to certain of the smaller stations at which direct loading and unloading were substituted wherever



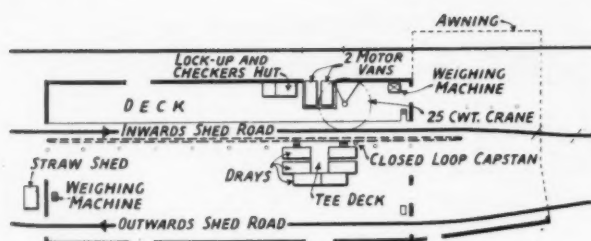


Fig. 1—Accrington

possible for barrowing. At intermediate sized stations, barrowing was reduced to a minimum by comparatively small modifications to the layout. An example of this is provided by the goods station at Accrington, Fig. 1, where the miscellaneous tonnage received amounts to an average of about 35 tons a day, and that forwarded to about 22 tons. It will be seen from the plan that there are two roads in the shed, one for inwards and one for outwards traffic. The deck which formerly served the latter has been removed, and a tee-deck has been provided on one side of the inwards road with accommodation for six drays to back on to it. Normally the inwards wagons are unloaded at the tee-deck, the contents of the wagon being discharged by one man inside the wagon with two more on the deck to check and pass the goods direct on to the drays. When a wagon has been unloaded, the whole raft of wagons is moved forward so that the next wagon comes opposite the tee-deck and can be similarly dealt with. The movement of the wagons is made by means of a closed-loop capstan, travelling 70 ft. a minute, operated electrically by push-button from the deck. When the button is pushed a loud warning bell rings for about five seconds before the movement begins.

The deck on the opposite side of the inwards road at Accrington can also be used for off-loading on to motor drays, two of which can be accommodated in the bay opposite the tee-deck. A 25-cwt. crane facilitates the handling of heavy loads. On the remaining part of this deck, goods not required for immediate town delivery may be discharged. The deck which formerly served the other road in the shed has been removed, and outwards traffic is loaded direct from town collection drays to the trucks standing upon it. The outwards and inwards traffic are thus completely separated, and there is no conflicting movement across the same deck. This arrangement of goods shed is recommended where only about five or six dray settings are required for inwards traffic. As a result of this comparatively simple modification at Accrington, the hours per ton (h.p.t.) of inwards traffic handled have been reduced by 30 per cent.

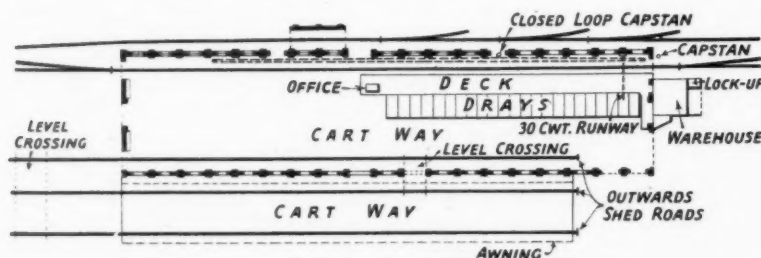


Fig. 2—Blackburn

For larger numbers of dray settings, other arrangements, though based on the same principles, have to be adopted. At Blackburn, for example, where the received miscellaneous traffic amounts to about 90 to 110 tons a day, the old decks have been removed, with the exception of a length of about 208 feet, which accommodates 23 dray settings (Fig. 2), and here the practice is to unload one wagon at a time as nearly opposite to the drays into which its contents are to be deposited as possible, the raft of wagons being moved forward by an electrically operated closed-loop capstan as at Accrington. Outwards traffic, again completely separated from inwards, is loaded direct into the wagons from the drays, all the other decks having been replaced by paved cartways. These modifications at Blackburn have reduced costs in hours per ton by about 40 per cent.

An improvement on the Blackburn arrangement is indicated by that adopted more recently at Burton-on-Trent (Fig. 3), where between 50 and 60 tons of miscellaneous traffic are received daily. Here the decks were abolished and replaced by cartways for the inwards traffic as well as the outwards traffic, and the wagons are unloaded one at a time on to pneumatic-tyred battery-driven electric trolleys of 25-cwt. capacity. The wagon to be unloaded is that nearest the outer end of the shed, and as each wagon is emptied the raft is moved forward by a closed-

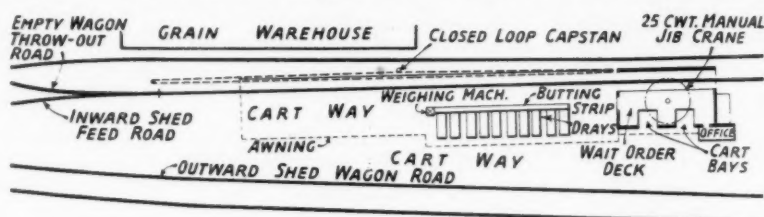


Fig. 3—Burton-on-Trent

loop capstan. Each wagon is unloaded direct on to the electric trolley by one wagon discharger, the trolley driver arranging the various consignments in positions corresponding with the different cartage rounds. When his trolley is fully loaded he moves off, making room for the next trolley, and proceeds down the narrow butting strip (shown on the plan and in one of the illustrations), against which twelve town cartage drays can be parked simultaneously. Proceeding from dray to dray the trolley driver and two loaders dispose of the trolley load across the butting strip and on to the appropriate drays, the consignments being checked by the dray loaders. The empty trolley then returns round the end of the butting strip to take a fresh load. Three trolleys are in use for this purpose, and as they work always in the same direction there are no conflicting movements. Outwards traffic is loaded direct into wagons as at Blackburn and Accrington.

A more recent example of the arrangement in force at Burton is to be seen at the new Talbot Road goods depot, Blackpool. Here the development of traffic necessitated the provision of a new goods shed on a piece of ground already in the possession of the company, and the arrangement is indicated in Fig. 4. The shed, which measures 275 ft. x 100 ft., contains four roads, all served by a reinforced concrete cartway. Three of the roads are used for inwards traffic, which amounts to from 70 to 120 tons a day, according to the season, and one is used



Front of goods shed at Burton-on-Trent with electric trolley being loaded direct from wagon. Note ample lighting arrangements for night work

for the 40 to 50 tons of outwards traffic. Here again the wagons are unloaded one at a time on to electric drays that discharge their loads over a 3-ft. butting strip on to town drays, eleven of which can be accommodated simultaneously against the strip.

As an experiment in respect of the idea of moving the traffic in bulk from the wagon unloading point to the town drays, instead of conveying it in small quantities by means of hand barrows, a sectional conveyor was installed at Lancaster (Castle), where some 50-60 tons of miscellaneous goods are received daily. It will be seen from Fig. 5 and the photographic reproductions that again a fixed position is established for the unloading of wagons, the raft being moved forward as each wagon is unloaded by means of a closed-loop capstan. When the contents of a wagon are unloaded on to the conveyor, each 15 ft. section can be moved ahead as required by pressing a button which operates an electrically-driven sprocket beneath the

conveyor section. As each length of conveyor is loaded, it is drawn forward opposite the drays by means of a "mule," i.e., a small electrically-propelled truck running alongside the conveyor, with a movable arm that can be coupled to the conveyor. Here only three men are required, one to unload the wagon and two to deal with the conveyor loads, moving the goods on to the drays and simultaneously checking them. Not only have the costs at Lancaster (Castle) been reduced by 45 per cent., but the experience gained by the experiment has been extremely valuable in the devising of schemes for larger depots. It will be observed that in all these modernisation schemes checking is normally done at the same time as the goods are stacked on the town drays ready for delivery.

Based on the success of the improvements at the smaller stations, schemes have now been approved for further and more ambitious modifications, and, as we recorded in THE RAILWAY GAZETTE of February 5, the existing goods

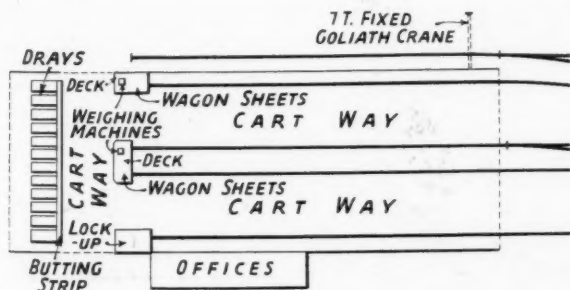


Fig. 4—Blackpool (Bolton Road)

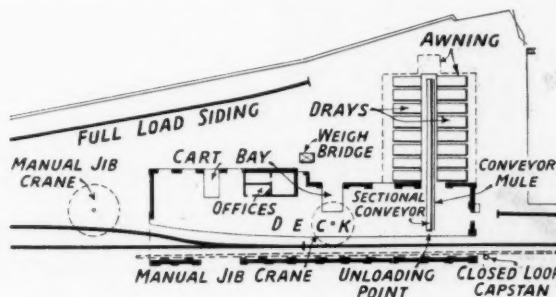
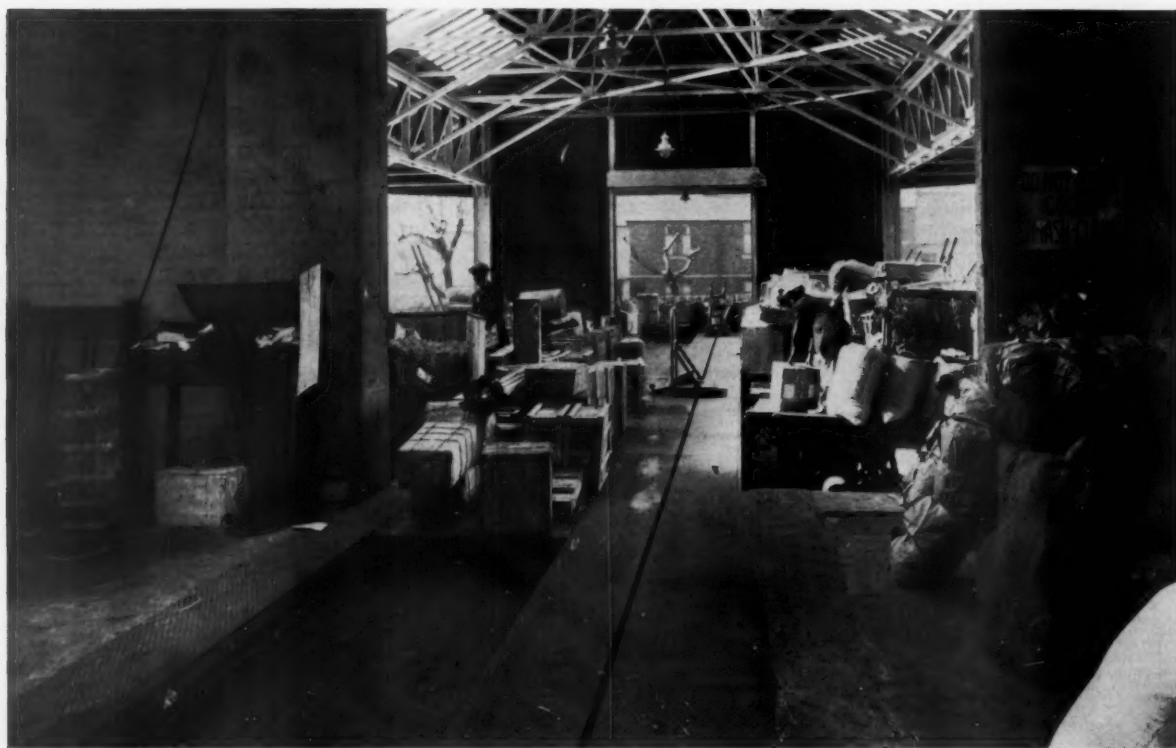


Fig. 5—Lancaster (Castle)



*Loaded conveyor section being moved forward by "mule" opposite appropriate delivery drays. Front part of next section of conveyor, seen loaded opposite the wagon door, is being moved forward to bring the remainder up for loading*



*Contents of loaded conveyor section being discharged on to delivery drays  
LANCASTER (CASTLE) GOODS DEPOT, L.M.S.R.*



depots at Ancoats (Manchester) and Coventry are about to be brought thoroughly up to date (Figs. 6 and 7). In addition, an entirely new goods depot is to be provided at Derby (Fig. 8), one of the principal advantages of which will be the concentration there of much of the north-south tranship traffic that at present has to be dealt with at a variety of stations, many of which are already taxed to capacity. Naturally, the problem is much more complicated in the larger stations, but in all these schemes the underlying principles adopted are a logical development from the experience gained at the smaller stations, adapted, of course, to the varying needs and possibilities of the circumstances in each case.

In all these three depots the same principles will be adopted, namely, reduction to a minimum of barrowing; direct loading and unloading wherever possible; and separation of outwards and inwards traffic. At Coventry and Ancoats the only decks to be retained in the goods sheds will be those serving inwards traffic, but at the new depot at Derby there will be no decks at all in the ordinary sense. In all these three large depots the unloading of wagons will be done by machines of an ingenious design (Fig. 9), the positions of which are indicated on the plans. Each consists essentially of a power-driven rubber belt conveyor 2 ft. wide, one end of which is opposite the wagon door, and the other end permanently coupled to a length of roller conveyor. The wagon unloading machine,

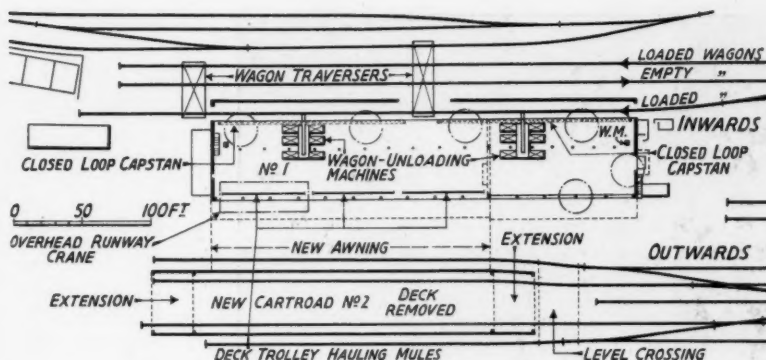


Fig. 7—New arrangements at Coventry

mounted as a unit on a narrow deck, can be moved forward by power so that the front of the belt conveyor penetrates into the wagon. On each side of the machine there are skid plates, fixed at right angles to it, on to which the articles brought forward from the wagon are placed so that they slide towards the sorting trolleys standing end-on to the unloading machine.

The transfer of the goods from wagon to sorting trolley is undertaken normally by a team of men, two men inside the wagon unloading on to the machine and the others outside checking and unloading the goods from the machine on to the sorting trolleys. By loading heavy articles over the nose of the belt conveyor, much of the weight lifting normally required is obviated. Push-button control is provided on each side of the machine, both for starting and stopping the belt and for moving it forward into or backward out of the wagon.

An incidental practice which has been developed in connection with unloading by the aid of this machine, and known as the "anvil" method, is the use of one package about knee-high upon which one of the men places other packages for the second man to lift out of the wagon on to the conveyor, the last of all to be placed thereon being the package that has been used as an "anvil." This method is now also used generally when two men are engaged in the unloading of goods and their transfer from vehicle to vehicle.

The wagons at these three goods stations, as at the others described above, will be fed singly to the unloading point, but at Derby two of the closed-loop type of capstan that will be used to move the wagons forward have been elaborated to avoid the necessity of a man getting down on to the track to couple a length of chain from the capstan rope on to the wagon hornblock. By means of a wagon-hauling "mule," the propulsion of the wagons is achieved automatically by the mere pressing of a button controlled from the unloading machine deck. The arrangement is shown in Fig. 10, from which it will be seen that the "mule" is housed under the edge of

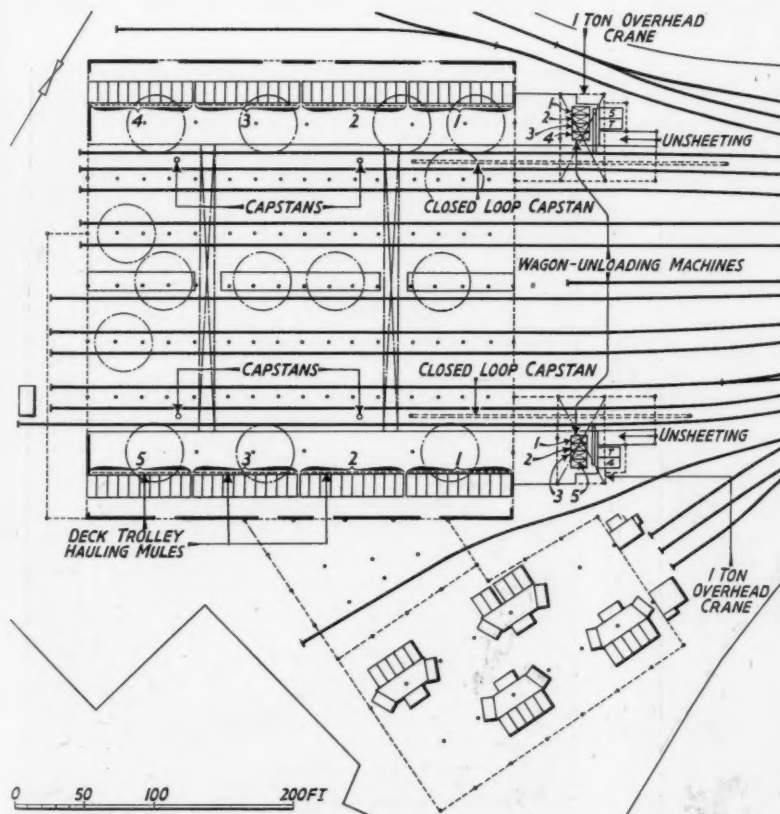
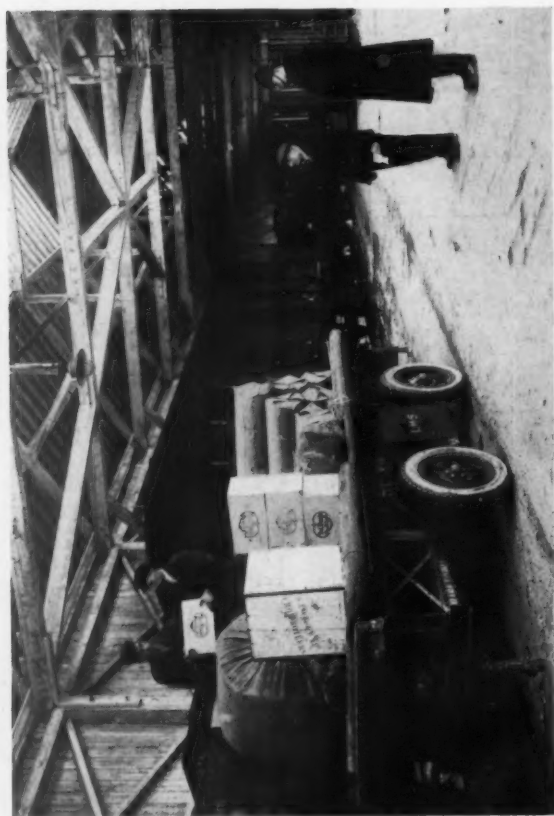


Fig. 6—Modified layout at Ancoats, Manchester



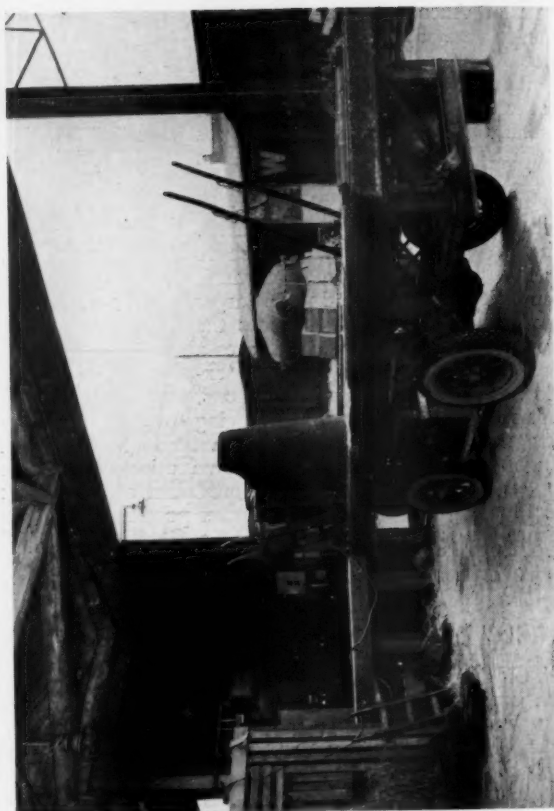
*Left : Unloading from wagon to electric trolley in goods shed.*



*Right : Transferring contents of trolley to delivery drays across butting strip*



*Left : Close-d-loop capstan for moving wagons.*

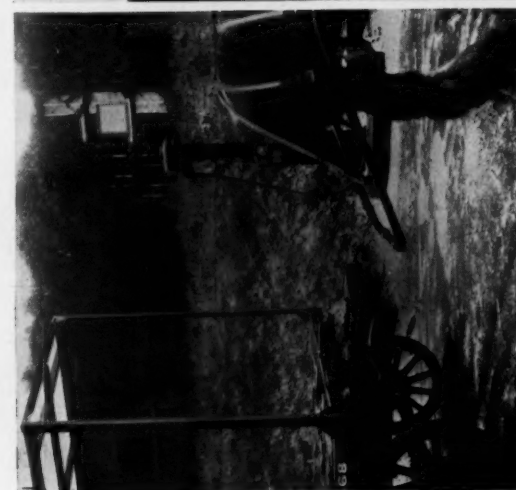
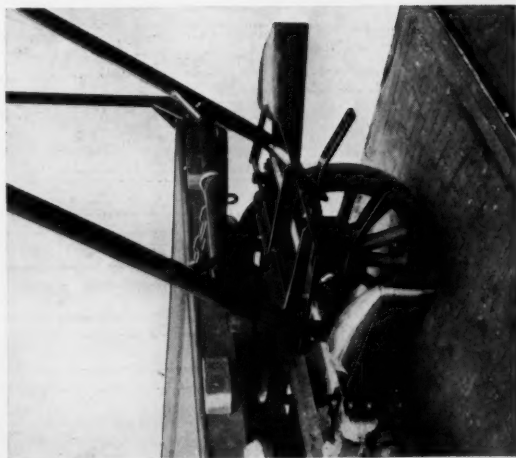


*Right : Electric trolley being charged. Capstan control buttons can be seen on goods shed pillar. The scenes on this page are at Burton-on-Trent*

Left: Closed-loop capstan for moving wagons. Tensioning arrangement in foreground; capstan beyond third pillar of goods shed. Right: Electric trolley being charged. Capstan control buttons can be seen on goods shed pillar. The scenes on this page are at Burton-on-Trent



Left: Loaded electric trolley. Right: Direct loading from town collection dray to wagons on outwards loading road. Note labelling of wagons to show destination



Method of automatically coupling horse to depot sorting dray. Framework for covering dray has only three pillars so as to leave two sides unobstructed for loading MODERNISING GOODS DEPOTS ON THE L.M.S.R.



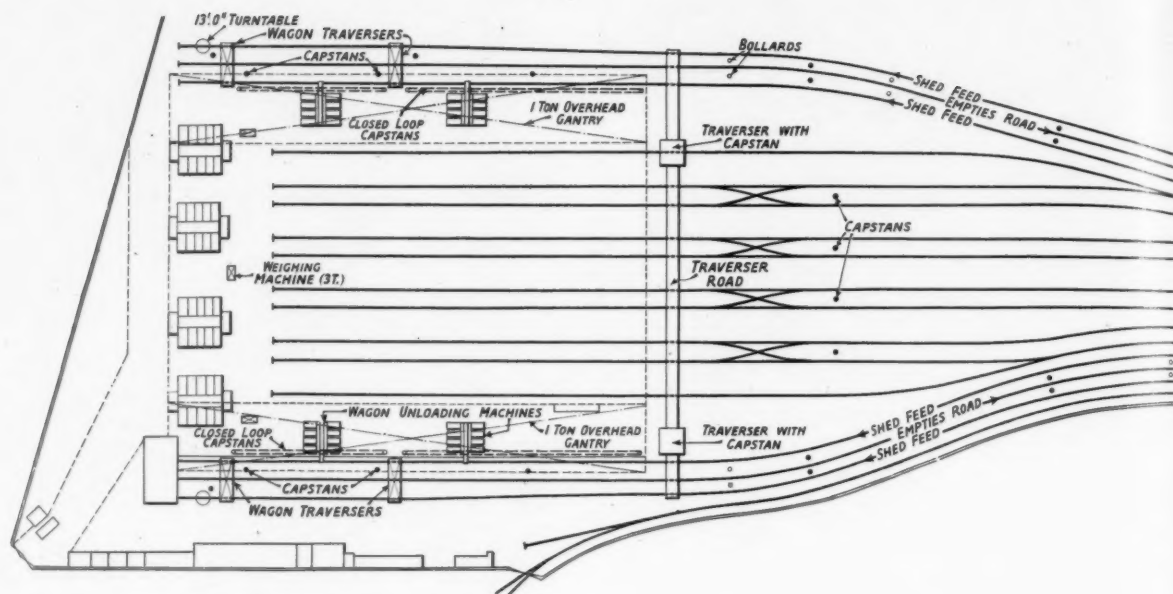


Fig. 8—Layout of new goods depot at Derby

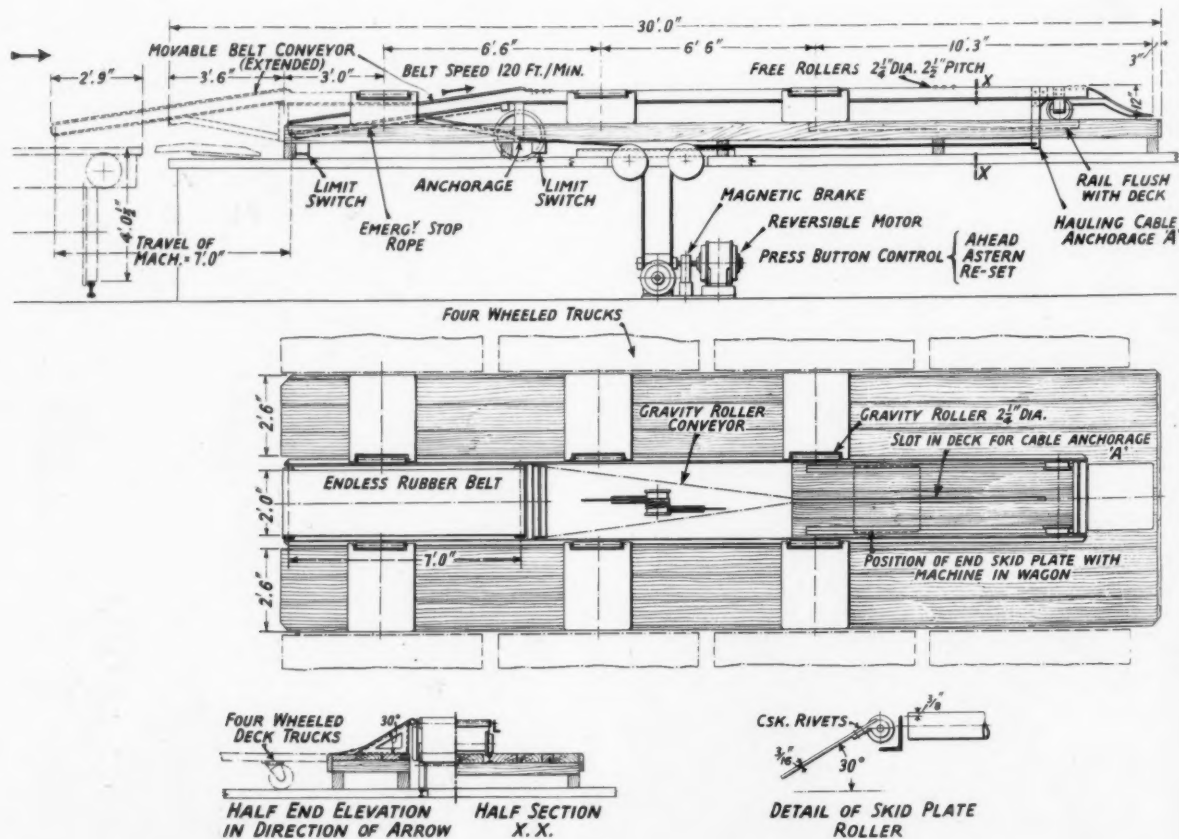


Fig. 9—Wagon unloading machine details

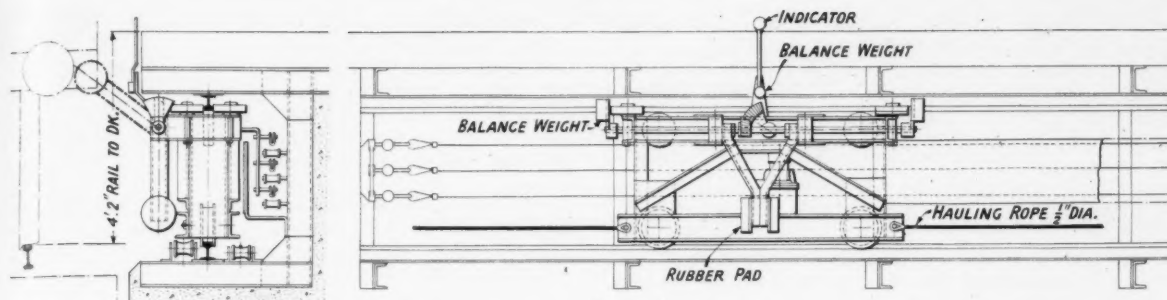


Fig. 10—Wagon hauling "mule"

the deck. An arm which can be raised at will engages with the headstock of the wagon, and an indicator projecting near the edge of the platform shows the position of the "mule" and enables the operator to bring it opposite the wagon before raising the engaging arm. Should this indicator encounter a wagon door or other obstacles, it will tilt over until it passes the obstruction and then regain its normal position. Since the "mule" is capable of travelling in either direction, a wagon which may have overrun the unloading point can be pushed back by the "mule" to the correct position. To ensure that the wagon shall stop when the "mule" ceases pushing, the wagon brake lever is dropped in its guard so as to apply the brake lightly.

For the other two unloading positions at Derby—where the only decks are those on which the wagon unloading machines are mounted—and at Ancoats and Coventry, the ordinary closed-loop type of capstan will be installed. At all three depots traversers, in the positions indicated on the plans, will be used for disposing of the wagons as they are unloaded. It will be seen that at Derby, where there are four unloading machines, two on each side of the new shed, every machine has its own independent feed road, and each pair shares the same empties road. As wagons are unloaded at the machine nearest to the railway end of the shed, they are moved forward by the capstan on to the first traverser and run out over the empties road. The unloading machine near the road end of the shed is fed over the second traverser, the empties being discharged in a similar way to those from the first unloading machine. The same principles will be adopted at Coventry.

As explained in the previous article (February 5), at Ancoats nearly 200 loaded wagons are dealt with inwards and over 200 outwards daily. Here the existing two main decks in the goods shed are to be extended under cover by 60 ft., with a width of 30 ft., and in these extensions the

unloading machines will be fixed. There will be a number of deck trolleys, four of which will be parked against each unloading machine to deal with the four principal town delivery districts. In addition, accommodation on the opposite sides of each wagon unloading machine will be provided for two sorting drays to convey tranship traffic to other wagons in the shed, for delivery traffic to outlying areas.

At Ancoats, as well as at Coventry (where an average of over 100 wagons of miscellaneous traffic is received daily and where two unloading machines are to be installed, as shown in Fig. 7), the deck trolleys will be conveyed from the machines by tractors running on the deck to hauling "mules" indicated on the plans, and shown in Fig. 11. By means of these "mules," the speed of which is 70 ft. per min., the trolleys are towed along the cart front, to be stopped opposite the appropriate carts to which their contents are to be transferred. The principle is the same as that of the wagon hauling "mule" already described, a closed-loop capstan below the deck surface being used to tow the "mule" along. The towing arm projects through a narrow groove in the deck and this arm is coupled to the front of the deck trolley by a chain and hook. The loaded trolleys will be placed at one end of the dray loader's section, and one at a time they will be taken by the "mule" along the cart deck for discharge. At the end of the section empty trolleys will be detached and pushed to one side by hand for the tractors to take back to the machines, and the "mule" returned to the far end for another loaded trolley. Push-button control is arranged on columns near the deck edge, or pendant from the roof of the shed.

When the new depot at Derby is in operation it will be capable of handling some 900 tons of freight traffic daily, including 375 wagons of outwards traffic. There will be no decks in the Derby shed (similar to the arrangement at Blackpool and Burton-on-Trent) and the goods will be

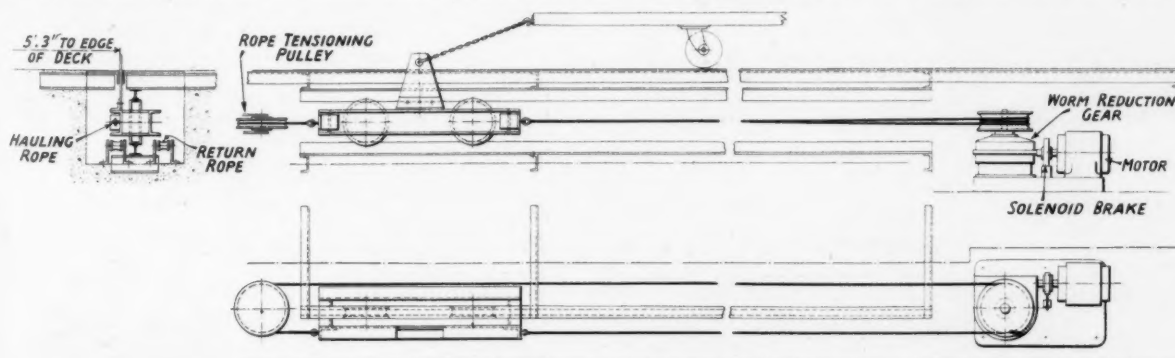


Fig. 11—Deck trolley hauling "mule"

distributed to the tranship wagons or the town cartage vehicles by a fleet of horse-drawn sorting drays. Eight drays will be accommodated against each unloading machine, and these when loaded will be drawn either to the wagons standing on the lines in the shed, or to the town delivery banks, each of which will have accommodation for ten town drays. The shed drays will have a new type of shaft, with automatic couplings by means of which the attachment of a horse can be accomplished in a few seconds.

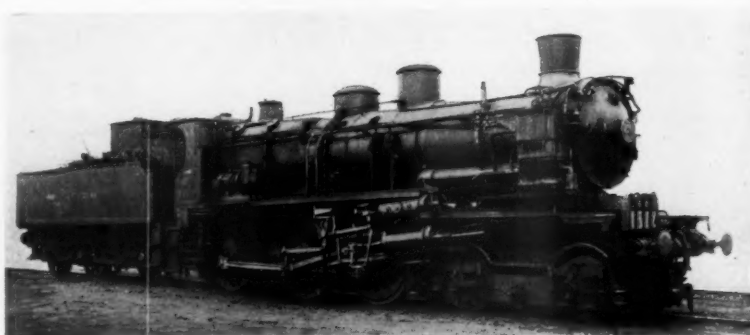
Outwards traffic at these three depots will be dealt with quite separately from the inwards traffic, the loads at Coventry being transferred direct from town dray to wagon. At Ancoats and Derby, however, the town drays

conveying outwards traffic will discharge their loads across outwards sorting banks on to sorting drays, five of which can be accommodated at each bank. The sorting drays will then be hauled to the wagons standing on the roads in the main shed for discharge direct into them. These outwards sorting platforms will be accommodated under a new roof, with an extension to provide a covered way to the existing shed.

These new arrangements will greatly accelerate the handling of goods, at the same time reducing the cost thereof, and it is proposed to extend their application widely throughout the system, the soundness of the principles adopted having been proved by the exhaustive tests and analyses made in the first place at the smaller stations.

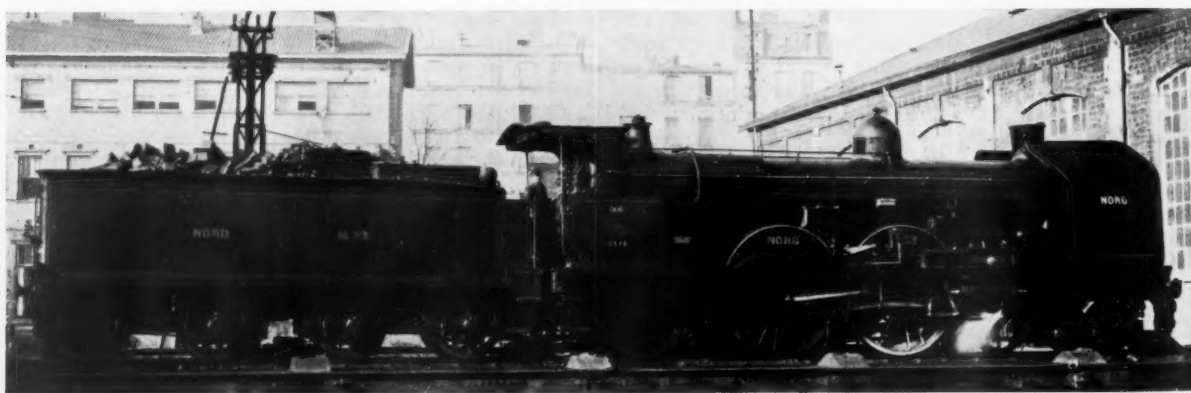
## REJUVENATION OF FRENCH LOCOMOTIVES

The remarkable improvement in performance of these early standard Nord locomotives as a result of equipping them with Lemaître blastpipes and larger chimneys was recorded in our issue of January 22. Comparative tests between No. 3.556 and a similar engine with the Nord standard blastpipe showed that at 120 km.p.h. (74½ m.p.h.) with 50 and 75 per cent. cut-off in the high pressure and low pressure cylinders respectively, the drawbar h.p. of the original engine did not exceed 500 with a back pressure of 1,300 gr. per cm. sq. (18.6 lb. per sq. in.). At the same speed and cut-offs the modified locomotive gave a drawbar h.p. of 900 with a back pressure of 650 gr. per cm. sq. (9.3 lb. per sq. in.). The maximum power developed at 80 km.p.h. (50 m.p.h.) with 60 and 70 per cent. cut-offs in high and low pressure cylinders respectively was 1,640 h.p. with the Lemaître engine as against



No. 2.654 4-4-2 express locomotive with Lemaître blastpipe, C. de f. du Nord

a maximum of 1,370 h.p. at 70 km.p.h. (43½ m.p.h.) and 60 and 75 per cent. cut-offs with the engine in its original condition with the former standard type of Nord blastpipe and chimney.



No. 3.556 4-6-0 mixed traffic locomotive with Lemaître blastpipe, C. de f. du Nord

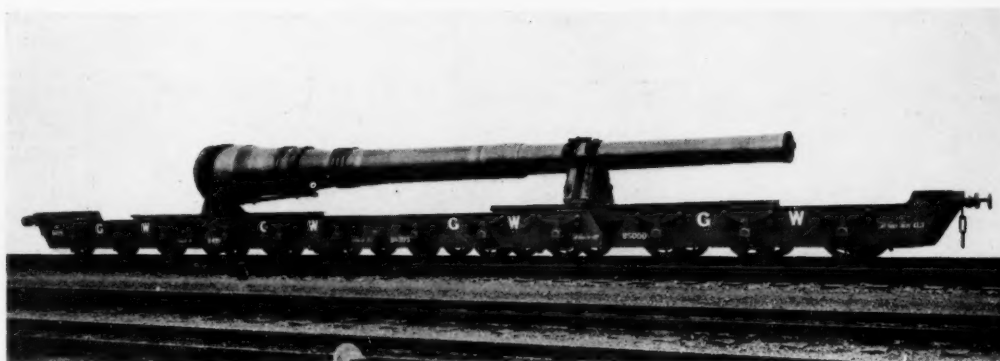
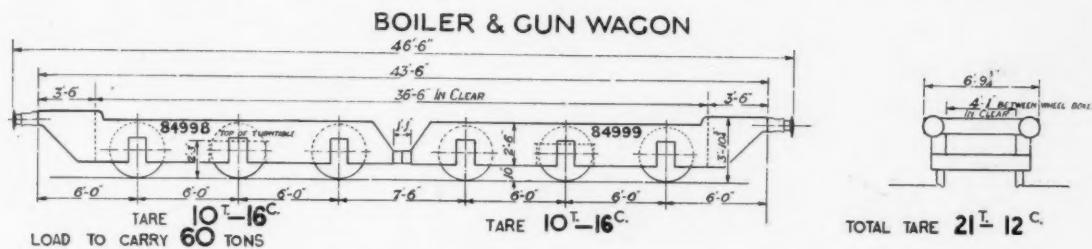
IMPROVEMENTS AT HUNSTANTON AND HEACHAM, L.N.E.R.—The L.N.E.R. has decided to carry out improvements to the facilities at Hunstanton station. The principal improvements are to be the enlargement of the circulating area; a new awning over the concourse, and new platform barriers; a new awning on the east side; and new offices for the stationmaster, ticket collectors, and porters. The parcels office is to be considerably extended

and platform No. 3 will be increased in length from 520 to 770 ft.; platform No. 4 will be extended from 515 to 740 ft. Additional accommodation for 43 carriages is to be provided, the engine shed is to be modified to give access at both ends, a new engine pit 60 ft. long will be constructed, and further provision made for engines taking water. The loop line at Heacham station is to be extended to enable two 13-coach trains to be crossed.



## G.W.R. Vehicles for Exceptional Loads—II

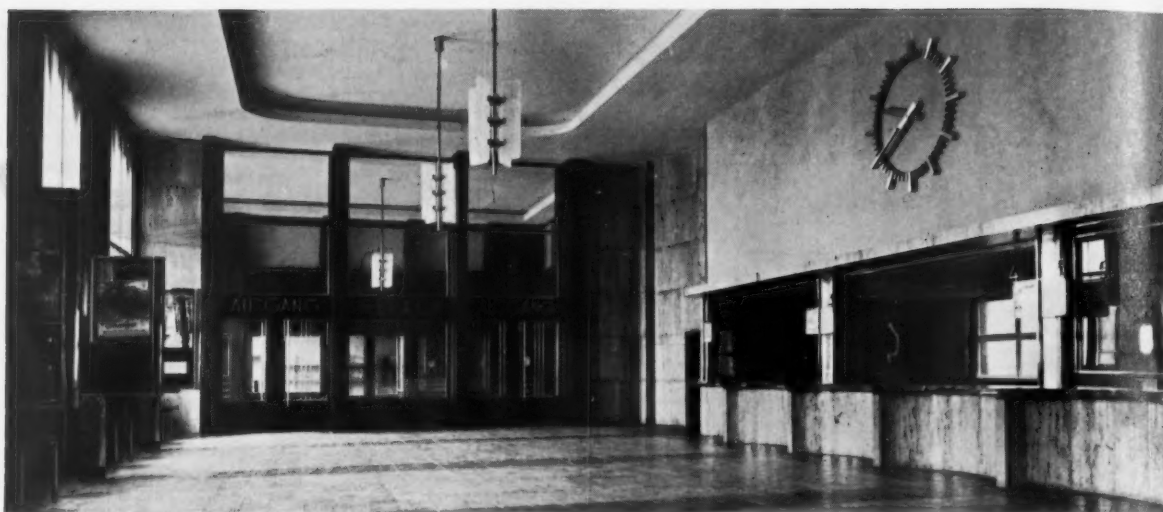
*These wagons, shown in use for the transport of ordnance, are designed to carry heavy industrial equipment and machinery*



Two twelve-wheel units, of the type shown in the drawing, carrying a naval gun 62 ft. long and weighing 108 tons. More usual duties are the carriage of boilers, bridge girders, and similar loads



Anti-aircraft guns on a 34-ft. trolley wagon, also used for steam rollers, traction engines, and motor chassis



*Above : Interior of booking hall, showing, on right, the new ticket counter replacing the former windows*



*Right : A view of the ticket office from the clerks' side of the counter*

*Below : Method of advertisement display, and stools for passengers consulting timetable books*



## Reconstruction of Mainz Station, German State Railway

*(See Overseas paragraph on page 371 last week)*

## RAILWAY NEWS SECTION

### PERSONAL

On February 16 the King conferred the dignity of Viscount upon the Rt. Hon. Hamar, Baron Greenwood, by the name, style and title of Viscount Greenwood of Holbourne in the County of London.

On February 24 he also conferred the dignity of Baron upon Sir Harry Duncan McGowan, K.B.E., by the name, style and title of Baron McGowan, of Ardeer, in the County of Ayr.

These honours were in the New Year list, and were announced in our issue of February 5. Viscount Greenwood is Chairman of Dorman Long & Co. Ltd., and Baron McGowan is Chairman, Imperial Chemical Industries Limited.

At an Investiture at Buckingham Palace on February 25, the King conferred the honour of knighthood upon Mr. Amos Lowrey Ayre, O.B.E., J.P., a Member of the Railway Staff National Tribunal; and upon Mr. William Biggart Lang, J.P., President of the Machine Tool Trades' Association. Their knighthoods were gazetted in the New Year Honours list, as recorded in our issue of February 5.

### LONDON PASSENGER TRANSPORT BOARD ORGANISATION

With effect from February 8, the following appointments are announced:—

Mr. Ivor Fraser to be Chief Commercial Officer;

Mr. A. C. Richardson to be Chief Welfare Officer;

Mr. H. S. Gordon to be Welfare Superintendent;

Mr. H. C. Davy to be Acting Treasurer;

Mr. Trevor L. Davies to be Assistant Acting Treasurer (Payments);

Messrs. W. A. C. Snook and J. H. Williams to be Joint Superintendents of Rolling Stock (Central and Country Buses and Coaches);

Mr. A. Bassom to be Indoor Superintendent (Country Buses and Coaches);

Mr. T. C. West to be Assistant Estate Agent;

Mr. W. P. N. Edwards to be Personal Assistant to the General Manager (Railways); and

Mr. C. B. Gilbert to be Officer (Special Services).

It will be recalled that Mr. Ivor Fraser was formerly Publicity Manager of the old Underground group of companies, and that he resigned as from November 1, 1924, to take up the position of Manager of *The Morning Post*.

Mr. G. S. Simmons, Chief Mechanical Engineer, Gold Coast Government Railway, has retired.

We regret to announce the death, on February 27, of Sir Walter Baker Clode, M.A., K.C., who was President of the Railway Rates Tribunal from 1922 to 1932, in his 81st year. Son of Mr. C. M. Clode, late Legal Secretary to the War Department, Sir Walter was educated at Winchester and Oriel College, Oxford, where he subsequently took his M.A. degree. He was called to the Bar at the Inner Temple in



*Elliott* [ & Fry  
The late Sir Walter B. Clode, M.A.,  
K.C.,

President, Railway Rates Tribunal,  
1922-32

1881, and joined the Northern Circuit, but afterwards enjoyed a large practice for many years at the Parliamentary Bar. He was leading counsel for the Railway Companies' Association at the Gattie inquiry in 1919, and had wide experience in compensation, and rating cases. Sir Walter was the author of a treatise "The Rating of Railways." He took silk in 1912 and was made a Bencher of his Inn in 1920. On November 2, 1922, the King appointed him by warrant to succeed the late Sir F. Gore-Browne, K.C., as permanent member and President of the Railway Rates Tribunal, and in the birthday honours list of 1928 he received his knighthood. It was in November, 1932, that he retired after 10 years as President of the tribunal.

M. Alfred Descamps, President of the board of the Société des Mines de Lens, has been elected a Director of the Northern Railway of France in place of the late M. Félix Bollaert.

Mr. L. K. Everitt has been appointed a Director of Edgar Allen & Co. Ltd.

The son of Mr. C. K. Everitt, Chairman of the company, Mr. L. K. Everitt has, since 1924, been gaining experience in the crucible steel melting side of the business.

### INSTITUTION OF CIVIL ENGINEERS.

H.R.H. the Duke of Kent, K.G., K.T., G.C.M.G., G.C.V.O., has been elected an honorary member.

The following associate members have been transferred to the class of full members:—

Mr. H. A. McGillicuddy, B.E. (Royal Univ., Ireland), Resident (Chief) Engineer of the Cordoba Central Railway, and Engineer of the Rafaela Steam Tramway, Argentina; and

Mr. C. G. Sturt, A.F.C., B.Sc. (Eng'g, London), Resident Engineer, Gorakpur, Bengal & North Western Railway, India.

### L.M.S.R. APPOINTMENTS

The following appointments have been approved by the directors:—

*Chief Commercial and Chief Operating Managers' Departments*

Mr. J. Harrison, Stationmaster, Birmingham (New Street), to be Stationmaster, Euston.

Mr. F. G. Hewitt, Stationmaster, Sheffield, to be Stationmaster, Birmingham (New Street).

Mr. F. C. O'Connor, Stationmaster, Northampton Castle (also in charge of Bridge Street and St. John's stations), to be Stationmaster, Sheffield.

Sir Henry Burt, K.C.I.E., C.B.E., sometime President of the Indian Railway Board, Government Director of Indian Railways, Chairman of the Bengal & North Western, the Oudh & Rohilkund and the Bengal Doorga Railways and a Director of the Bombay Baroda & Central India Railway, whose death we announced in our issue of November 6 last, left estate valued at £15,311 (£11,989 net).

We regret to announce the death, on February 22, of Mr. John Blackburn, M.A., who retired from the position of Secretary of the former Caledonian Railway in 1920. He was educated at Eton and Oxford, and was called to the Bar, Inner Temple, in 1880. From 1887 to 1891 he was Private Secretary to the Marquis of Lothian, Secretary for Scotland, and became Secretary to the Caledonian Railway Company in the latter year. He was 82 years of age.

Among the unopposed returned candidates for the triennial election to the Hertfordshire County Council is Mr. A. J. Brickwell, the late Surveyor to the London & North Eastern Railway (Southern Area), who has been returned



for the Brunswick Park Ward of East Barnet.

Sir Ralph Wedgwood and his Indian inquiry committee arrived back in London, on their return from India, yesterday afternoon, March 4.

Mr. C. E. Rich, Secretary of the London board of the Buenos Ayres & Pacific Railway, arrived in Buenos Aires on February 6 on a business visit.

We regret to announce the death of Sir Henry Allan, sometime Chairman of the former Caledonian Railway, in his 70th year. He was decorated with the Cross of the Legion of Honour in connection with President Poincaré's visit to Glasgow in the winter of 1919-20.

Mr. Robert Hollard-Martin, Chairman of the Southern Railway, at the company's meeting on February 25 (reported on page 434), referring to the retirement of Messrs. Cox and Bushrod said: "Our Traffic Manager, Mr. E. C. Cox, to whose great services to this railway since its amalgamation I wish to bear tribute, retired in the autumn on account of his age. Courteous, able, endowed with a charming personality, he was beloved by all officers, men and the public with whom he came in contact. To him, and to his Superintendent of Operation, Mr. Bushrod, who retired about the same time, the company owes a deep debt of gratitude. . . . In his place we have moved up Mr. Missenden, who has done such good work at Southampton, and we have filled Mr. Missenden's place at Southampton by the appointment of Mr. Biddle, his able assistant, to be Docks and Marine Manager."



Sir Josiah Stamp, supported by the board of L.M.S.R. directors, addressing the annual meeting at the Friends' House, Euston Road, last Friday

*Snow plough—referred to in our Overseas columns of page 415—at work on the Jungfrau Railway, showing the Mönch in the background*

[Photo:  
R. Schudel,  
Grindelwald]



At a meeting of the Huddersfield Corporation and L.M.S.R. Joint Omnibus Committee, held at Huddersfield on February 25, Mr. H. G. N. Read, Road and Air Transport Assistant to the Chief Commercial Manager, L.M.S.R., was appointed Chairman of the Joint Committee for the ensuing twelve months in succession to Alderman T. Canby, J.P., Chairman of the Huddersfield Corporation Passenger Transport Committee. Mr. Read has served on the joint committee for a number of years; he was concerned in its inception and in the subsequent joint arrangements.

Mr. Albert Morrison, F.I.S.A., M.Inst.T., who, as announced in our issue of February 26, has been appointed General Manager of the Northern Ireland Road Transport Board, began his business career in London, where he was employed until the outbreak of war. He joined the Army in 1914, and served with the 8th Battalion Royal Fusiliers; after being wounded on active service, he was transferred to the reserve at Carrickfergus. On being demobilised in March, 1919, Mr. Morrison settled in that town and was engaged in the printing business until he joined the staff of the Belfast Omnibus Company as Accountant, in February, 1930. A few months later he became Chief Accountant and was appointed Assistant General Manager early in 1934. On the formation of the Northern Ireland Road Transport Board Mr. Morrison was first appointed Secretary and Chief Accountant to the board, and in January of last year became Assistant General Manager, the position from which he has now been promoted to be General Manager.

#### PRESENTATION TO MR. JOHN MILLER

On February 26, a gathering of over 500, representative of all grades of staff in the Engineer's Department, retired staff, and also of other Areas, assembled in the York Railway Institute gymnasium for the purpose of expressing their regard and affection for Mr. and Mrs. Miller on the occasion of Mr. Miller's retirement.

Mr. A. Cameron, District Engineer, York, who presided, said he desired Mrs. and Miss Harrison, who were present, to convey to Mr. F. E. Harrison an expression of sympathy in his indisposition, and also of regret at his unavoidable absence. He then referred to the wonderful spirit which Mr. Miller had

inculcated into all members of his staff by his efficiency, enthusiasm, energy and courage, also to the important works he had carried out and the many innovations he had made since coming to the North Eastern Area over 12 years ago.

The following members of the staff also expressed their appreciation of Mr. Miller's regime: Messrs. T. W. Forster, W. B. McIntyre, G. Reed, G. Franks, J. Anderson, A. Smith, and W. Bygott. Mr. H. E. Stratton, representing the Engineer and staff of the Southern Area of the L.N.E.R. conveyed the good wishes of the staff of that area, and Messrs. J. Triffitt and H. J. Rudgard expressed their good wishes on behalf of the retired staff.

The presentation was made by Mr. Taylor Thompson, who has succeeded Mr. Harrison as Assistant Engineer at York. He referred to Mr. Miller's unique personality, and recounted episodes showing Mr. Miller's many-sided character and his great sympathy for the well-being of his staff. The presentation took the form of an illuminated address, bound in an album, on the parchment pages of which were the signatures of the subscribers, together with photographs of important engineering works with which Mr. Miller had been associated, and the depots and stores which he had inaugurated. There was, in addition, a Zeiss Ikonta camera. Mrs. Miller also received two travelling cases and a Thermos cabinet.

Mr. Miller, in responding, expressed his appreciation of the good wishes of the staff and for the gifts, which he said would remind Mrs. Miller and himself of their many very happy associations since coming to York. He assured his audience that he was looking forward with pleasure to his retirement, and, although it had been said that he was a great lover of work, his motto in life had always been to have a team around him who could be relied upon to undertake the work as he directed. He intended, in his retirement, to do the things he had not time to do in his working career, and to visit many interesting places throughout the world. Mrs. Miller expressed her appreciation of the gifts, and said she would always treasure the many friendships she had made there, and trusted that, in the future, she would have many opportunities for renewing them.

#### DINNER TO MR. MILLER

On February 26 Mr. John Miller was entertained to dinner at the Station Hotel, York, by his fellow officers, on the occasion of his retirement from the post of Engineer, North Eastern Area, L.N.E.R., and was presented with a pair of field glasses, and a second pair for Mrs. Miller. Mr. C. M. Jenkin Jones, Divisional General Manager of the area, presided over a large gathering of present and retired officers, while letters of regret for inability to be present were received from Sir Ralph Wedgwood, who was on the

voyage home from India, from Sir Nigel Gresley, and from others who included Mr. F. E. Harrison, Mr. Miller's successor as Engineer to the area, who unfortunately was a victim of influenza.

Mr. Jenkin Jones, in proposing Mr. Miller's health, said that he had brought a new technique to bear on the problem of maintaining permanent way, and had stamped his personality, as few men could, on the whole area, in spite of the relatively short time it had been under his charge. He was a man of wide interests, a scholar, and an athlete, and he had taken an exceptional interest in the welfare of the staff.

Mr. Paul Gibb, in supporting Mr. Jenkin Jones, stressed the warm personal regard in which Mr. Miller was held by his fellow officers and by all his staff; and Mr. O. H. Corble, who represented the Chief General Manager, added a tribute on behalf of the headquarters staff.

Mr. Miller, in replying, described his varied and interesting professional career. He desired to express his gratitude to the staff of his own department for their loyal and hard work, and to the staff of all the other departments for their cordial co-operation. He had been fortunate in the large number of friends he had made in the

course of his work, and he intended to maintain all these pleasant contacts.

The retired officers were strongly represented, and Dr. McBride proposed their health in a humorous speech, to which Mr. A. C. Stamer replied.

Among the company were:—

Messrs. S. T. Burgoyne, W. A. Fiddian, J. S. Harper, L. Ballan, L. Sproat, H. Arnott, E. M. Rutter, P. A. Harverson, A. S. Buswell, E. W. I. Arkle, P. Liddell, W. H. Brown, G. Sowerby, H. S. Cole, A. A. Ryan, T. F. Cameron, W. W. Masser, J. J. Lovatt, W. E. Blakey, E. V. Taylor, K. P. Walker, L. E. Marr, H. F. Sander-son, A. Tulip, J. Taylor Thompson, A. Cameron, C. Carslake, J. H. McIlvenna, H. Hills, F. H. Colebrook, J. H. Smeddle, C. H. Ellison, H. A. Watson, F. H. Graveson, H. Gent, H. J. Rudgard, T. H. Ellis, F. C. Buscarlet, W. Hudson, J. Triffitt, R. O. J. Dallmeyer, T. H. Royle, and E. F. Fleet.

#### INDIAN RAILWAY STAFF CHANGES

Mr. A. Cooper on return from leave has been appointed Deputy Chief Operating Superintendent (M.), N.W.R.

Mr. H. C. Wallace, Deputy Chief Mechanical Engineer, E.I.R., has been permitted to retire from Government service as from January 10.

Mr. R. Hatt-Cook has been permitted to retire from Government service as from January 23.

Colonel H. L. Woodhouse, M.C., Director of Civil Engineering, Railway board, has been granted six months' leave as from January 30.

## QUESTIONS IN PARLIAMENT

### Rolling Stock on Suburban Lines

Mr. B. Bull (Middlesex, Enfield—U.), on February 24 asked the Minister of Transport, whether, in view of the local dissatisfaction with regard to the condition of much of the rolling stock on the suburban lines serving Liverpool Street, he would represent to the railway companies concerned the desirability of its early improvement or replacement.

Mr. Hore-Belisha (Minister of Transport): I will call the attention of the railway company to my hon. friend's question and, if he desires to supplement it by details relating to any particular suburban lines, I will forward the information to the company.

### Proposed Tube Extension

Mr. H. Day (Southwark, Central—Lab.), on February 24 asked the Minister of Transport, whether he could give particulars of the proposed extension of the tube between the Elephant & Castle and Camberwell.

Mr. Hore-Belisha: This matter is now before the Standing Joint Committee.

### South African Railway Agreement

Lieutenant-Commander Fletcher (Nuneaton—Lab.) on March 2 asked the Secretary of State for Dominion Affairs if, under an agreement concluded last month, the claim of the Union Government of South Africa to purchase a section of the railway from Vryburg to Palapye, in Bechuanaland, was recognised; if this recognition was accorded in consideration of

an undertaking not to press the claim for 33½ years; whether, seeing that under section B of this railway agreement the consent of His Majesty's Government was essential, such consent had been given; and whether he was prepared to give an assurance that this agreement would in no way affect the full and free consideration of the political future of the protectorate of Bechuanaland.

Mr. Malcolm MacDonald (Secretary of State for Dominion Affairs) replied as follows:—

An agreement of the nature referred to in the first two parts of the question was recently concluded between the Governments of the Union of South Africa and Southern Rhodesia, and the Mashonaland and Rhodesia Railway Companies.

It was explained to the parties concerned that His Majesty's Government in the United Kingdom feels that as under the agreement the option to purchase the section of the line in question is not exercisable until a period of 33½ years has expired, it would not be possible for it to bind itself now to a definite course on the expiry of that period. His Majesty's Government in the Union has, however, been informed that His Majesty's Government in the United Kingdom will gladly undertake to maintain contact with it on this question and will give careful consideration to such proposals as the Union Government may wish in due course to make.

The answer to the last part of the question is in the affirmative.

## SOUTHERN RAILWAY COMPANY

*Progress and development—Electrification extensions and finance—  
Higher cost of current—The "third rail" objectors answered—  
New Nine Elms equipment—Southampton records—Rating refunds*

The annual general meeting of the Southern Railway Company was held at Southern House, Cannon Street Station, E.C.4, on Thursday, February 25, Mr. Robert Holland-Martin, C.B. (Chairman of the company), presiding.

The Secretary (Major L. F. S. Dawes) read the notice convening the meeting.

The Chairman said:—

My Lords, ladies and gentlemen, before I deal with the report and accounts, I should like to draw your attention to some important changes that have taken place in our personnel in the last few months.

Our Traffic Manager, Mr. E. C. Cox, to whose great services to this railway since its amalgamation I wish to bear tribute, retired in the autumn on account of his age. Courteous, able, endowed with a charming personality, he was beloved by all officers, men and the public with whom he came in contact. To him, and to his Superintendent of Operation, Mr. Bushrod, who retired about the same time, the company owes a deep debt of gratitude. Mr. Cox, with that youthful ardour he possesses in spite of his years, determined to see something more of the other side of the world before settling down, so he and Mrs. Cox were in the Antipodes when news came of the well-deserved honour, the C.V.O., conferred on him by His Majesty the King. His friends there doubtless toasted him, and I would take this opportunity of congratulating him publicly on behalf of the shareholders, officers and men of the Southern Railway.

In his place we have moved up Mr. Missenden, who has done such good work at Southampton, and we have filled Mr. Missenden's place at Southampton by the appointment of Mr. Biddle, his able assistant, to be Docks and Marine Manager.

I assume you will take the report and accounts as read. That being so, I now propose, as is the custom at these meetings, to go through the accounts very rapidly, and call your attention only to the more important items. Under the heading of "Nominal Capital Authorised and Created" there is a new item of £6,000,000 which sum was authorised and created under the Southern Railway Act of 1936 as collateral security against the loan of a corresponding amount which we shall receive from the Railway Finance Corporation Limited. I shall refer to this later.

### Capital Expenditure

The capital expenditure for the year amounts to £1,719,000 and is composed principally as follows:—

Electrification of line	983,000
Additions and improvements at stations, &c. (Surbiton, Richmond, Peckham Rye, Bournemouth Central, Portsmouth Harbour, Nine Elms, Tonbridge, Woking)	333,000
Rolling stock	456,000
Southampton Docks extension, 2nd stage	147,000
Sundry credits	250,000
	Cr.

The item under the heading of "Rolling Stock" represents the capital improvement in our rolling stock up to the end of 1934. For many years past we have been breaking up all our 4-wheeled and 6-wheeled passenger-carrying stock and replacing it by modern bogie vehicles including electric stock. The improvement in the rolling stock represented by this item of £456,000 is arrived at over a period of years since the amalgamation. I think everybody will admit that our rolling stock is in a very much better condition and much more up to date than it was 15 years ago. The amount of £250,000 under the heading of "Sundry Credits" is accounted for partly by the sale of property

which is no longer required for railway purposes, and to the extent of £150,000 by the following circumstances:—

Until the new ferries now running between Dover and Dunkerque were brought into use the service to and from Dunkerque was worked by a French company called the A.L.A. in which we are interested to the extent of 80 per cent. For various reasons it became necessary to retain the A.L.A. Company in existence and for that company to participate in the ferry service between Dunkerque and Dover. To effect this we have transferred to the A.L.A. Company one of the three ferry boats at cost price, and have therefore had to adjust our capital account to the extent of £150,000.

Turning now to the revenue receipts and expenditure of our whole undertaking, I have the following remarks to make:—

Railway gross receipts increased by	£ 608,000
of which about £60,000 can be attributed to the fact that 1936 being Leap Year gave us one additional weekday's earnings.	
Receipts from ordinary passengers and workmen advanced by	399,000
and	
Season tickets by	104,000
but there was a fall under the heading of	
Parcels and other merchandise by passenger train of...	56,000
and an increase under the heading of	
Mails and parcel post of...	17,000

### Record Electric Traffic

The total number of passenger journeys, including those made by season ticket holders and workmen, amounted to 360,000,000 in 1936 as compared with 349,000,000 in 1935. This increase of 11,000,000 passenger journeys is reflected under all headings. For instance, the receipts between London and stations outside the electrified area show an increase of £80,000. The number of passengers carried by rail in connection with the Continental and Channel Islands traffic increased by 210,000 and our rail receipts by £96,000. Here again I shall have more to say later on. The number of passengers in the electrified area increased by over 8½ millions with an increase in receipts of £245,000. As compared with 1932 the increase in the number of passenger journeys throughout our system was no less than 43,000,000 and of these the electrified area claims 35,000,000. This represents a growth in the number carried in the electrified area of 15 per cent. and an increase in the passenger receipts in that area for 1936 of no less than £1,054,000 or nearly 17 per cent.

The decrease under the heading of parcels and merchandise by passenger train was in the carrying of milk and butter due largely to the operation of the Milk Marketing Board. Under the heading of goods train traffic receipts there is an improvement of £136,000; an increase of £132,000 and nearly 180,000 tons in the higher classes of traffic, and £30,000 and 170,000 tons in coal, coke and patent fuel were partially counter-balanced by a decrease of £26,000 and 130,000 tons in road making and building material. Miscellaneous traffic receipts increased by £8,600.

Turning now to the expenditure side of railway operation, we find there was an increase of £381,000, £40,000 of which is attributable to the restoration of the percentage deduction in wages from 2½ per cent. to 1½ per cent. which took place in August last year. £65,000 is due to increased expenditure on new works charged to revenue. The works were relatively insignificant in character, and were in most cases carried out to enable economies to be effected.

An increase in the price of electric current purchased for electric traction cost us £52,000. Actually the price we



paid for purchased current advanced during the year by 0.043d. per unit, whereas the increased cost of the current we generated ourselves only advanced by 0.013d. per unit. In regard to this I would remind you that when we were contemplating carrying out large extensions of electrification about 16 or 17 years ago the Government refused us permission to construct any new generating station on the ground that we should be able to buy current at a cheaper rate than we could generate it ourselves. This has certainly not proved to be the case.

Allocations to reserve to meet the extension in our electrical services cost £4,000 more than in 1935 and the increased provision for our superannuation funds referred to in the report sent out with the accounts came to £6,000. National Insurance cost us £18,000 more as a result of more men being employed and the fact of higher contributions under the Widows', Orphans' and Old Age Contributory Pensions Act, 1925. The remainder of the increased expenditure of some £200,000 is attributable mostly to locomotive running and traffic expenses. This increase, I think you will agree, is not excessive, considering the much larger volume of traffic which had to be dealt with.

#### Continental Traffic Improvement

The net receipts from railway working are higher by £227,000. Continental traffics have at last shown a welcome increase. The total number of passengers carried by all the Southern Railway Continental and Channel Islands steamboat services rose by nearly 60,000 to 1,216,085. Cargo increased by 10,059 tons and motor cars by 1,243. The increase has been particularly noticeable since the devaluation of the French franc last October, an increase of 32,303 passengers occurring in the last three months of the year. This year, what with the inward traffic for the Coronation and the outward for the Paris Exhibition, to say nothing of the increased numbers of people going on tour and for the winter sports, the increase should be large.

Although there was this welcome recovery in our Continental traffic, the fact is not reflected in our steamboat revenue. For the reason that the bulk of the increased passengers travelled by the Ostend route owing to the cheapness of fares via Belgium as compared with the fares via France. As you are aware, the boats on the Ostend route belong to the Belgian Government and not to us. The traffic however has begun to revert to the French routes, and our steamboats are benefiting accordingly.

Docks, harbours and wharves have done very well with an increase in net receipts of nearly £28,000. The receipts increased by £100,000 and the expenditure by £73,000. But I shall tell you of the new records in almost every branch of business later on.

The net receipts from our hotels increased by £3,000 but the profit from our cartage and delivery service was reduced by £25,000. This was brought about by a reallocation of receipts as between railway and cartage and delivery services in accordance with a pre-arranged plan. The loss in connection with our air transport ventures was reduced from £9,000 in 1935 to £4,500 due chiefly to the discontinuance of the Southampton—Isle of Wight services in which we co-operated with the Spartan Air Line in 1935.

Taking the railway and ancillary businesses together, we arrive at an increase in net receipts of £233,000. Rents from houses, lands, hotels, &c., advanced by £19,000 but we spent £20,000 more on upkeep. Interest and dividends from investments in other undertakings—such as Hay's Wharf Cartage—brought in £4,000 more but general interest decreased by £57,000 and grants received from H.M. Treasury by £14,000. The decrease in general interest (£57,000) is covered by the amount we had to pay to the Railway Finance Corporation to enable them to meet their liability under the Act and the decrease in amount of grant received from H.M. Treasury is due to the rate of interest being reduced from 5 per cent. to 2½ per cent. in accordance with the arrangement come to when the work at Southampton was taken in hand. Interest on superannuation and other funds absorbed an extra £15,000.

We therefore find ourselves with an increase of net revenue for the year of £153,863, and this enables us to

recommend to you a dividend on the deferred ordinary stock of one-half of one per cent. (the first dividend on this stock since 1930), necessitating a slight reduction in the carry forward of £5,000 from £225,000 to £220,000.

I am certain that the stockholders must be glad to see the item general reserve account appearing once more in our general balance sheet. We have re-opened that account with £500,000 of the moneys received in respect of rates and rates relief. You may remember that in 1923 we had £500,000 on that account, all of which was used up in 1926 to enable the company to cope with the needs of the bad times we were then passing through.

#### Railway Finance Corporation

In my speech last year, I told you that the Government had passed an Act authorising the Treasury to guarantee repayment of principal and interest of securities to be issued by a finance corporation formed for the purpose of raising money required by the main-line railway companies at a lower rate of interest than the railway companies could themselves obtain if they went into the market. The Railway Finance Corporation Limited was accordingly registered on December 24, 1935, and an agreement between the corporation and the four main-line railway companies, incorporating the terms of the agreement between the Treasury and the companies was entered into on January 23, 1936.

The corporation issued £27,000,000 2½ debenture stock at £97 per cent. realising £26,190,000 which is to be loaned to the railway companies. The Southern's share of this amount is 12/53rds or £5,929,811 which is being taken up in four annual instalments of £1,250,000 and a final instalment of £929,811. The balance due to the company retained at any time by the corporation is invested by the latter, the earnings therefrom going to the reduction of the company's liability to the corporation for interest.

The amount which the company will have to repay the corporation in 15 years' time will be £6,113,207, the difference between this figure and the amount borrowed, £5,929,811, representing the company's proportion of the discount on the issue of the corporation's stock, viz., £183,396. The expenses of issuing the corporation's debenture stock amounted to £65,700, the Southern's proportion of which was £14,875. This, together with the discount mentioned above, is being written off over the period of the loan, namely, 16 years. In addition to the expenses mentioned above the company's liability to the corporation for interest for the year amounted to £64,000.

In pursuance of the terms of the Treasury agreement the company obtained powers in their Act of last year to create £6,000,000 4 per cent. debenture stock as collateral security for the loan. The stock is to be charged in favour of, or issued to, the Finance Corporation if and when required, but it has been ascertained from the Treasury Solicitor that no steps in this respect need be taken at present. The company, by the same Act, also obtained powers to raise, by stock of any description, cash to the extent of £6,000,000 for the purpose of repaying the loan. The amount received on loan from the corporation in 1936, £1,250,000, appears as a special item in the balance sheet.

#### Electrification Extensions

We have undertaken to expend during the next five years, practically the whole of the amount of the loan from the Railway Finance Corporation, in extending the system of electrification, and we propose to bring the various extensions into use in accordance with the following programme:—

London to Portsmouth via Guildford, Woking to Alton via Aldershot and Staines to Weybridge in July, 1937.

London to Portsmouth via Horsham, including the lines from Three Bridges to Horsham and from Worthing to Fratton and the branches to Bognor Regis and Littlehampton in July, 1938.

Staines to Reading, Ascot to Aldershot and Aldershot to Guildford in January, 1939.

Sevenoaks to Hastings via Orpington and Crowhurst to Bexhill in July, 1939.

Gravesend and Swanley to Chatham and Gillingham and Strood to Maidstone in 1940.

We are satisfied that each of these schemes of electrification will conduce to the comfort and well-being of our

regular travellers and will equally be of benefit to the shareholders.

You will probably have seen in the press that our Bill, which contains scarcely any contentious matters, has been persistently blocked in the House of Commons for no reasons connected with opposition to anything contained in the Bill, but because the objectors allege that the extension of the third rail system into rural districts is dangerous to human beings and in particular to children and to livestock and to the amenities of the countryside.

#### Case for the Third Rail

The present protest against the third rail began in the neighbourhood of Horsham, and we had the pleasure of meeting a deputation representative of landowners (C.L.A.), farmers (F.U.) and estate agents. It was stated that the extension of the third rail was a terror in the minds of parents, of farmers whose cattle might leave the crossings and try to go up the line, and of hunting folk whose energies even now were diverted from riding to hounds to heading the fox and the hounds wherever the electric line was in front of them. If these terrors had any foundation they would form a strong indictment of our system, so we could not be other than sympathetic. We enquired as to the fatalities on which they were based and how the deputation would propose to deal with extensive electrification, since it could hardly be supposed in view of the millions we have expended on electrification in installing one of the only two systems allowed by Parliament, we could lightly scrap our system and substitute for it the only other permitted system, the overhead.

It was suggested that if the whole third rail system could not be scrapped, it might at some point be converted to overhead; that, alternatively, some system might be installed whereby the rail was only intermittently electrified for the passage of a train; or that there might be some means devised of protecting the third rail by a covering. To those not versed in electric problems, one or other of these solutions may seem possible, but each has very serious objections.

In the first place, it must always be borne in mind, as I have stated above, that after very serious consideration, Parliament decided on two, and only two, methods: the low voltage system with the third rail and voltages up to 750 volts, and the high voltage system with overhead wires and voltages up to 1,500 volts; both to be d.c. In our case we use the low voltage third rail system with a voltage of about 600. Both systems have their advocates, and it was only after very careful investigation and examination by experts that the board of this railway after amalgamation decided that of the two systems then existing on their railway—the overhead used by the L.B. & S.C. and the third rail used by the L.S.W.R.—it would adopt the third rail, which system has, as you know, proved very successful.

Could protection be given by putting a board protection at each side, as is sometimes done now in special places? This has technical and working objections. What then, of the intermittent section to be charged or made dead by the passage of a train? Our trains follow each other so frequently that this system is quite impracticable, but if it were not it would introduce the danger that no one would know whether the current was "on" an electric line or "off."

Now as to danger. The low voltage used (about 600) does not involve in the case of a healthy person more than a sharp shock. There have therefore been few fatalities, I am glad to say, to human beings. I will return to this later. Under Government regulations, the line has to be fenced, and the most modern method is by using posts and eight strands of wire. Our standard fencing has a minimum of ten wires in electrified areas, and where there is special danger of its being climbed or got through by children or animals, a wire mesh is added. That is to say, the electric line runs in a fenced conduit throughout its length, save where another fenced line comes in or an unfenced siding, or where there is a platform crossing or a cattle

or footpath crossing. A footway or cattleway is never carried over the third rail—the third rail ceases on each side of a public crossing, so that the only people or animals that can be harmed are those who leave the crossing and proceed along the line.

Here again, if the passenger crossing is a busy one, a footbridge is put up, and at a cattle crossing a grid of triangular pieces of wood that animals will not walk on or over is put down on either side of the crossing. Casualties from persons or animals walking up the line from crossings have been very rare, and the accidents that are attributable to shock have been confined to a few persons who have climbed over the fence for some purpose of their own. A certain number of stray dogs and cats have been electrocuted, also a few hounds, and in country districts with rivers like the Fittle area, some otters and badgers have been killed. These last mentioned animals are particularly prone to shock, for not only are their coats usually damp, but they apparently try to get under instead of over the third rail.

The company will, as it has always done, take every and ample care to prevent improper access to its line, but the public on their part must realise that a railway line with its fast and increasing service of trains and with the additional danger of the electric current differs little in negotiability from a fast flowing fordable river, and should only be crossed where crossings are provided for the public. Were this recognised, the number of fatalities, now remarkably few compared with those resulting from other forms of transport, would be confined to those who get on the line with intent to destroy themselves. Such are the facts of the case, which I hope will allay the alarm which has arisen in West Sussex.

#### Nine Elms

Many of those present must in their homeward journeys in the dark winter evenings have seen floodlit in the darkness a fine riverside building between Vauxhall and Clapham Junction. That building is the new Southern Railway granary and store that we have built at Nine Elms under the able superintendence of your Engineer, Mr. Ellison, and Dr. Faber, the well-known concrete expert. It has been floodlit because we are proud of its construction and wished the public to know of our activities, but incidentally that floodlighting of its walls provides the best possible distribution of light for those working in that portion of the Nine Elms Goods Yard which surrounds it.

When the London & Southampton Railway first came to London, Nine Elms was its terminus, and it was placed there (I quote from the first report) because of its ready access to the river by which the passengers could by frequent steamboats continue their journeys to the City and West End. Alas, today we no longer think of our great river as a means of passenger transport from side to side and place to place, but we do still use it for the transport of goods. Much of the goods brought to the port of London is lightered up from the Pool and the docks to the wharves and warehouses on our southern side of the river, and Nine Elms forms an excellent point for landing and storing goods, particularly grain, much of which travels to its final destination over your railway.

The storage area of this new warehouse is approximately three acres, which is sufficient to accommodate some 12,000 tons of merchandise. All the floors are bone dry, brilliantly lighted and amply ventilated. They are served by six new electric cranes, each of which can lift from two barges lying alongside 30 cwt. at a radius of 70 feet or 5 tons at a radius of 27 feet. These can deliver direct to any floor or to elevators serving those floors whence for distribution 16 conveyor chutes convey sacks to any floor. Three lifts with a capacity of 2 tons each carry goods other than sacks from floor to floor. For the convenience of customers who take storage space we have provided a show room easily reached from Waterloo in a very few minutes. Other improvements have been carried out at Nine Elms, which I would remind you is the largest goods depot in London, such as the new traffic shed which holds 40 wagons and 50 road vehicles alongside the platforms—and the shed built for the shipping traffic that arrives in large quantities from Southampton Docks which

will accommodate 46 wagons and 50 road vehicles. This shed has an area of 41,000 sq. ft.

Our Channel ferry, Dover to Dunkerque, which was opened by the French Ambassador in October, is doing well and has brought us much praise. Up to the end of the year 12,460 passengers and 8,559 tons of cargo were carried by it. Many people find it by far the least tiring way of paying a short visit to Paris. Our goods traffic by the ferry has not increased as we should wish, but the war in Spain, poor trade conditions in Southern Europe, and tariffs amply account for this.

The number of passengers to and from the Channel Islands was 175,591 compared with 170,996 in 1935. The authorities in all the islands are doing their best to encourage visitors to come to these delectable isles. The cruises of the s.s. *St. Briac* to the Seine and elsewhere have been very popular and are to continue this year.

The number of visitors to the Isle of Wight continues to increase. There was an increase of 81,061 passengers carried by the Portsmouth boats, and the total number of passengers carried, 2,381,735, was the highest recorded. A new paddle boat for the Portsmouth—Ryde service will be placed in service in time for the heavy summer traffic.

#### Southampton

At Southampton, I am able to report an activity unequalled in previous years. The number of ships in and out was 6,792, an increase of 570, or 9·2 per cent. Their gross tonnage rose by 2·6 per cent. to 36,980,521 tons. The cargo they carried increased by 9·5 per cent. to 710,289 tons inward, and by 5·1 per cent. to 419,770 tons outward. The passengers in and out increased by 4·3 per cent. to 560,542, and in addition, there was a movement of 93,808 troops, an increase of 65·5 per cent.

The tonnage of shipping entering the docks was the highest ever recorded, as was also the number of passengers dealt with. This was in part brought about by the improving conditions in the North Atlantic passenger trade and by the introduction of larger and faster ships into the Union Castle Mail SS. Co. fleet. Early in 1936 the Baltimore Mail Line instituted a fortnightly service between Southampton and Baltimore, U.S.A.

Then came the commissioning of the *Queen Mary*, that 80,000 ton wonder-ship of the Cunard Company. She made her maiden voyage on May 27 last year, and has now, after an overhaul in our King George V graving dock, just started again on her voyages. We wish her every success and shall welcome the advent of her sister ship in two years' time. The Union Castle Line, determined to speed up the South African Mail service, placed in service two splendid new vessels, the *Stirling Castle* and the *Athlone Castle*, and they reduced the time taken on the voyage from 17 to 14 days.

On several occasions during the past year nearly all the berths at the docks and the new extension quay were simultaneously occupied, and on August 22 last more than 300,000 gross tons of shipping were dealt with in twelve hours. On that day the following ships were all to be seen in our docks: *Empress of Britain*, *Europa*, *Montrose*, *Orontes*, *Strathmore*, *Bencruachen*, *Bellerophon*, *Majestic*, *Orion*, *Georgic*, *Berengaria*, *Alaunia*, *Dilwara*, *Dorchester*, *Lancashire*, and *Almanzora* in addition to our own vessels. But at Southampton, our concern is with cargo as much as with passengers, and I am glad to be able to report a very satisfactory increase in freight traffic.

Our trade with the Empire countries was again very large, and increased shipments were received from South Africa, Australia and New Zealand. No less than 6,200,000 packages of South African fruit arrived at Southampton last year, approximately 90 per cent. of the United Kingdom imports of such produce from South Africa. This South African trade is most important to us, so to establish better relations with the growers and merchants of South Africa we sent Sir George Courthope and Sir Herbert Walker to the Cape in the autumn. They visited, amongst other cities, Cape Town, Johannesburg, Durban and Pretoria. They were extremely well received, making many friends and establishing valuable contacts.

In 1936 the timber trade at Southampton increased greatly and should continue to expand, helped by the completing of the offices, sawmills and storage accommodation that Montague L. Meyer & Co. Ltd. have erected on our docks extension estate. There was an increase, too, in the grain dealt with, due in large measure to J. Rank & Company's growing activity at their flour mills on our estate. Now that that estate (you will remember that it has all been reclaimed from tidal mud flats) has consolidated and it has been proved that heavy buildings, such as Rank's mills can be erected, we are hopeful that rapid developments will follow. Roads are being made and sewage and rain water drains are rapidly being completed. To encourage some of the smaller manufacturers to come to our port, we propose to erect two small factories suitable for many businesses, such as are now to be seen on the Slough Trading Estate. We have now 26 miles of sidings and railway available on the new estate, which is well equipped with electric power and water. Southampton rates, too, are low.

In 1935 Southampton claimed 41 per cent. of the ocean passenger traffic of the United Kingdom, and when the figures for 1936 are known, we are certain that our port's claim will be even greater. The improvement of the past year was, as I have said, due to the greatly increased movement of passengers on the North Atlantic routes. All the principal North Atlantic shipping companies using the port registered increased carryings. The increase of tonnage on the regular shipping routes caused a reduction in the number of ships available for passenger cruises, but Southampton more than retained its popularity as the base for such cruises, more than 60,000 passengers sailing in the sixty or more cruises starting from our port. Another source of income at the docks has been our day visitors, who numbered 450,000, nearly 250,000 of whom came to see the *Queen Mary*.

To enliven the somewhat sombre appearance of the port, the passenger and cargo sheds at Berths 43/44 in the Ocean Dock were redecorated, the extensions being painted to a colour scheme of orange and black. To deal with the increasing passenger traffic and to replace a shed which was destroyed by fire in June, 1936, a new cargo shed has been erected with an overall length of 517 ft. and a breadth of 147 ft.

#### Rating Refund

The Railway and Canal Commissioners have, as you know, finally entered in the railway valuation roll the sum of £1,077,131 as the net annual value of your company's undertaking for the first quinquennium ended March, 1936. In consequence, the rating authorities have to refund some £400,000, the sum overpaid by your company on the larger assessments in force in 1931 and during the quinquennium. This amount is being recovered from the local authorities. In addition, since payments on the unduly high assessments of 1931 were contributed—as they had to be—by your railway to the Railway Freight Rebates Fund, that fund has to refund the amounts overpaid between April, 1931, and December, 1936. For this purpose the Railway Clearing House, which administers the fund, has raised a loan on the security of the fund, and £1,265,000 has already been refunded to this company—£245,000 in December, 1936, and £1,020,000 in January, 1937. The balance will be received when the exact amount due is ascertained.

Of the amounts received, £250,000 was brought into revenue in 1935, and £270,000 in 1936, and the balance of £1,200,000 has been appropriated as follows: £500,000 to General Reserve Fund, as I have already told you, and £700,000 to Revenue Works Suspense Account. Some preferred ordinary stockholders and some deferred stockholders have written to me suggesting that this amount should have been given to the preferred and deferred stockholders, but under our constitution this is impossible, for profits have to be ascertained only out of the working of the year in account, and those profits have to go first to the holders of preferred stock up to a maximum of 5 per cent., then, as far as may be, to the holders of the deferred. Neither the preferred nor deferred stock carries a cumulative dividend, and any dividend can only be paid out of the earned profits of the year. To pay a dividend of 1 per cent. on



the preferred ordinary stock requires £275,866. In the quinquennium, if the assessments had not been unduly high a somewhat similar amount—it was, as I have said, in 1936 £270,000—would have been brought into revenue each year, let us say some £1,350,000, *i.e.*, £270,000 x 5, but as the case was not decided it was not forthcoming, and the preferred stockholders were unable to receive that amount, nor, as their stock is non-cumulative, could the amount be paid to them now—but it was clearly their money and not the deferred stockholders'. It has been thought right, therefore, and in the best interests of both preferred and deferred stockholders, to appropriate the £1,200,000 received to the company's reserve funds, hence the placing of £500,000 to General Reserve Fund and £700,000 to Revenue Works Suspense Account. In this way the holding of both classes of stockholders is bettered and the chances of both classes of stockholders participating in future dividends improved.

I have now laid before you an account of our stewardship of your varied businesses for the past year. It is a record that your board and officers present with pride, and I cannot but think that you will be proud of it too. It will always be our aim to do everything that will tend to increase the popularity and prosperity of your line, and in working for that object we realise fully that the getting of increasing traffics does not lie with London alone. We are endeavouring to make it realised that the Southern Railway is not merely a London business that has, somehow or other, reached certain towns in the country, but a real local partner of those towns, ready to co-operate in any way that will add to their popularity with the public. In such a way, they will gain visitors, and we passengers and traffic; and remember that in gaining those traffics, both passenger and goods, there is another partner besides the railway and the towns who can help greatly, namely the stockholders, and we look to you in this room and those thousands of stockholders who are not here today to impress on all their friends the beauties of the sunny southern counties that we serve, our easy access for both passengers and goods to the Continent and the world, and the comfort of travelling by Southern to and from their homes and work.

In the coming season with the festivities of the Coronation and the Naval Review and the thousands of visitors from our Dominions, and, indeed, from the whole world, the prospect would seem good, and I shall hope that next year, aided as your board is with a team of officers and men than which none is better in the country, able, keen, hardworking, ready to undertake at all hours anything to the advantage of the Southern Railway and its partner, the public, I shall be able to put before you an even better statement of progress.

The Chairman then formally moved the adoption of the report and accounts.

Mr. Eric Gore-Browne (Deputy Chairman) seconded the resolution.

#### The Discussion

Mr. Leslie Boyce congratulated the Chairman on the very successful, and satisfactory, account he had given of the company's activities, its progress, and its future prospects. With regard to the balance of £1,200,000 recovered in respect of the overpayment of rates in the years 1931 to 1934, as the directors' hands were definitely tied in one direction, he thought that, in appropriating £500,000 to the General Reserve Account and £700,000 to the Revenue Works Suspense Accounts the directors had done the best thing possible in the circumstances from the point of view of the preferred and deferred stockholders. If the £700,000 had not been allocated to the suspense account for new works, the whole cost of these new works would have had to be written off out of future revenue. Both classes of ordinary stockholders would, therefore, share the benefit to the extent that over a period of time there would be £700,000 more available for distribution by way of dividend. It had not been sufficiently recognised that the inauguration of the Dover-Dunkerque train-ferry was an epoch making event in the history of international transport. Its creation also involved a very remarkable engineering achievement. The difficulties in its construction were unique, and of such a

character that no engineer, however skilled or experienced, could possibly have foreseen or anticipated them. Yet they were successfully overcome.

Commander A. F. Inglefield hoped that the seven lean years with no dividend at all on the deferred stock presaged seven fat years. As Treasurer of the British Railway Stockholders Union he would like to express his thanks to the Chairman and the officers of the company for the courtesy and attention always, and especially this year, paid to the Union. He also wished to thank all the companies for putting the stockholders' case, as presented by their union, to the Railway Staff National Tribunal. It was perfectly fatuous of the road transport interests to propose that some of the money spent on armaments should be spent on roads. One of the first things that would happen in the case of war would be a shortage or a difficulty in the importation of petrol, and then where would the roads be? Road rates should be regulated as railway rates were, following the practice in South Africa and New Zealand. Under present conditions the railways ought to be able to close their rate books to prevent their competitors coming in to see them and under-quoting.

The Rev. J. P. Bacon-Phillips complained that passengers using cheap tickets had to travel at their own risk, and referred to an accident which had happened to himself when using one of those tickets, for which accident he had been unable to recover any compensation.

Mr. Hollins drew attention to the sufferings of travellers and the condition of the rolling stock on the Waterloo & City Railway during the rush hours, particularly at about 9.30 in the morning.

Mr. Wigan asked whether the company was following the example of the other railways and giving the employees a day off for the Coronation.

The Chairman: Yes we are. We are doing the same as the other railways.

Mr. Wigan also asked whether the company had recently made another application to the Board of Trade to generate its own electricity.

Mr. E. H. Greg drew attention to the bad loading of the Sunny South express and its slow speed. It took 6½ hours from Manchester to Brighton, and he could have done the journey in 4½ hours via London. In the winter months it ran only on Saturdays and Mondays. He also complained of the conditions on the platforms at Woking station during reconstruction.

#### Chairman's Reply

The Chairman: Ladies and gentlemen, if there are no other speakers I will just answer a question or two.

First of all, with regard to what Mr. Leslie Boyce said, I would thank him for his speech and for approving of what we did with the money which came from the rates recovery. Commander Inglefield, too, I am glad to say, thinks that he has the support of the British Railway Stockholders' Union in that we did well in putting the case of the four companies. He also referred to the road traffic. We agree with him wholeheartedly that the thing that is wanted is a regulation of rates, that it is perfectly unfair that road traffic carriers should be able to quote any rate which suits them, to come and see our rate books and then approach our customers and offer special rates. We want a fair rating deal for everybody.

Then Mr. Phillips has already written to me about his sad accident on the platform. I am afraid that he fell in getting into a train. We looked carefully into the case, but we could not find that we were liable in any way for that accident. We deplore it, but we do not assume any liability for that accident. I would further point out with regard to his complaint that cheap ticket holders do not realise that they in taking those cheap tickets forego certain claims, that this company's regulations are printed everywhere and should be known to everybody.

With regard to the Waterloo and City Railway, we deplore its condition as much as Mr. Hollins does. It is the thing, I think, on the railway that the Deputy Chairman and myself are least proud of; it is a horrible approach and we hope it will be made better, but we are at the present

moment waiting because there are certain matters in hand, certain ideas of new lines to the South by the London Passenger Transport Board which will entirely solve that situation, and will probably give us a chance of our getting lifts and save our passengers from walking up that horrible slope and those horrible 60 steps.

Then Mr. Wigan asked whether we had recently approached the Board of Trade about generating our own power. We have not done so, and I think now that the Government have got this grid system it would be almost useless still. They want to get the traffic all on that system, and they do not want and are all against the private generator.

Then Mr. Greg asked about the "Sunny South Express," and why it did not run on other days than Saturday and Monday. The reason is that we started it in conjunction with the other railway companies, running on all days, and we gradually cut it down because it was not needed for the traffic, except a poorish traffic at week ends. That is the reason why it only runs on those days, but we will look into it and see if by any chance we can revive it. Mr. Greg also raised a point about Woking station. That station is now under repair. When it is finished it is going to be a very good station, and I think the inhabitants of Woking will be proud of it.

Having answered those questions I will take the vote on the resolution that has been put. Those in favour . . . ? Those against . . . ? I declare the motion carried.

The next business is the declaration of dividends. I will ask the Secretary to read the resolution.

The Secretary: "That the following dividends be and the same are hereby declared:—For the half-year to December 31, 1936: 2½ per cent. on the 5 per cent. guaranteed preference stock; 2½ per cent. on the 5 per cent. redeemable preference stock (1957); 2½ per cent. on the 5 per cent. preference stock; 2½ per cent. on the 5 per cent. redeemable preference stock (1964) (making in each case, with the interim dividends, 5 per cent. for the whole year); 4 per cent. on the preferred ordinary stock (making with the interim dividend of 1 per cent., 5 per cent. for the whole year); ½ per cent. on the deferred ordinary stock for the whole year. And that such dividends be payable (subject to income tax) on March 2, 1937."

The Chairman: I move that resolution.

Mr. Eric Gore-Browne (Deputy Chairman) seconded, and the resolution was carried.

The Chairman: The next business relates to the retiring directors. There are five directors who retire at this meeting, namely Lord Clinton, Sir Francis Dent, Mr. Mansbridge, The Hon. Clive Pearson and Lord Rockley. We have had no notice of opposition to that, and I would tell you that

they all do valiant and very valuable service to the company. Therefore I beg to move, "That the following directors, who retire by rotation at this meeting, namely The Right Hon. Lord Clinton, Sir Francis H. Dent, Mr. Henry Mansbridge, The Hon. Clive Pearson, and The Right Hon. Lord Rockley, be and they are hereby elected directors of the company."

Mr. Eric Gore-Browne seconded, and the resolution was put and carried.

The Chairman: The next business relates to the retiring Auditor. Mr. Ford retires on this occasion and offers himself for re-election. This comes from the other side of the table.

Mr. M. A. Edwards moved that "Mr. Arthur Pelham Ford, F.C.A., be and he is hereby elected an Auditor of the Company." Mr. Ford is known to all of you, at any rate I think his name has appeared on the balance sheets of the company for a good many years, and I am sure he is a most excellent servant of the proprietors.

Mr. Leslie Boyce seconded, and the resolution was put and carried.

### SPECIAL GENERAL (WHARNCLIFFE) MEETING

The Chairman: Now we have resolved ourselves into a special general Wharncliffe meeting to consider the company's Bill in Parliament.

The Secretary read the notice.

The Chairman: All the proprietors have had notice of this Bill detailing its objects. I will only tell you that it is to obtain powers to construct a short length of railway to serve a proposed aerodrome at Lullingstone, near Eynsford (Kent), and, in connection with the extension of the electrification of the railway to Portsmouth and Hastings, to acquire lands for sub-stations and to stop up a number of level crossings.

The Chairman then moved the following resolution: "That this meeting having considered the Bill intended to be presented to Parliament, intituled, 'A Bill to empower the Southern Railway to construct a railway and other works and to acquire lands; to extend the time for the completion of certain works and the compulsory purchase of certain lands; and for other purposes,' approves thereof subject to such additions, alterations and variations as Parliament may think fit to make therein."

Mr. Eric Gore-Browne seconded, and the resolution was put and carried.

A vote of thanks to the Chairman and Directors and Management proposed by Mr. Leslie Boyce, was carried unanimously and with acclamation. The Chairman suitably replied and the proceedings terminated.

### L.M.S.R. AMBULANCE CENTRE IN 1936.

—Over 8,000 employees of the L.M.S.R. were successful in first-aid examinations during 1936, while since 1925 there have been over 104,000 examination successes among the company's staff in England and Wales, it is stated in the annual report of the L.M.S. Ambulance Centre. London heads the list of districts with the largest number (803) of successful students during the past year, while the Derby, Nottingham and Sheffield district had 750 "passes." Numbers of students passing examinations in the other districts were: King's Langley to Northampton, &c., 397; Rugby, 226; Kettering, Leicester, and Peterborough, 203; Bristol and Gloucester, 214; South Wales, 99; Central Wales, 169; Birmingham, 370; Wolverhampton, 264; North Staffs, 157; Crewe, Stafford and Shrewsbury, 466; Manchester, 445; Chester, 330; Liverpool, 326; North Wales and Ireland, 408; S.W. Lancs, 395; S.E. Lancs, 201; N.W. Lancs, 251; N.E. Lancs, 247; W. Yorks, 330; E. Yorks, 403;

Lancaster, Windermere and Carlisle, 323; Barrow-in-Furness, 155; and Somerset and Dorset, 72.

Nine members of the L.M.S.R. staff who have rendered first-aid in specially meritorious circumstances during the year have, with the approval of the Central Ambulance Council, been awarded certificates: V. T. Butler and G. Garwood (Stoke-on-Trent); A. H. Braithwaite and L. Rudge (Bromsgrove); H. A. Swift and R. Stanely (Cudworth); E. J. Miller (Commercial Road, London); W. Ford (Sheffield); and F. T. Wilshaw (Etruria).

COMING RAILWAY LOST PROPERTY SALES.—The lost and unclaimed property in possession of the Southern Railway prior to July 31 last will be sold by auction at the sale room, Griffin Street, York Road, Waterloo station, S.E.1, on Monday, March 15, and two following days. It is also announced that the G.W.R. will auction all lost property received up to December 31 last that has not been claimed by April 2.

FEATURES OF U.S.A. RAIL OPERATION IN 1936.—The outstanding features of railway operation in 1936 are summarised as follows by Dr. Julius H. Parmelee, Director, Bureau of Railway Economics of the Association of American Railroads:—

1. Freight traffic (ton miles) in 1936 increased 17.7 per cent. over 1935, and was 13.4 per cent. below 1930.

2. Passenger traffic (passenger miles) increased 19.1 per cent. over 1935, and was 18.0 per cent. below 1930.

3. Operating revenues increased 16.0 per cent. over 1935, while operating expenses increased 12.8 per cent.

4. Net railway operating income amounted to \$645,000,000 in 1936, an increase of \$145,000,000 over 1935, but a decline of \$224,000,000 under 1930. The rate of return in 1936 was 2.5 per cent.

5. The net income after fixed charges is estimated at \$150,000,000 in 1936, compared with a net income in 1935 of \$7,539,127, and a net income of \$497,000,000 in 1930.

6. The upward trend in these several factors was greater in the second half of the year 1936 than in the first half.

## LONDON MIDLAND AND SCOTTISH RAILWAY COMPANY

*Improved results—Maintenance costs—Saving in locomotive mileage—Reduction in rating—Reasons for opposing "A" licences—Welding developments—The use of scrap—Derby Staff College—Modern methods*

The fourteenth annual general meeting of the London Midland & Scottish Railway Company was held last Friday, February 26, at Friends House, Euston Road, London, N.W.1, Sir Josiah Charles Stamp, G.C.B., G.B.E. (Chairman of the company), presiding.

The Secretary (Mr. Owen Glynn Roberts) read the notice convening the meeting.

The Chairman: Ladies and gentlemen, I now lay on the table the report and accounts for the past year, and as they have been in your hands for some days, I presume you will as usual take them as read.

You will remember that during 1935 we lost two long experienced and valuable Directors, Lord Knutsford and Sir John Beale. We have now strengthened the board, which was becoming too low in numbers for effective committee work, by the appointment of three directors. Mr. S. R. Beale was already a member of our Scottish Local Committee, and has succeeded to many of his brother's great business interests. Lord Clanfield has important manufacturing and commercial connections, and can thus speak for a great area upon our system; while the unique experience of Lord Wigram in wide public affairs needs no comment. Last year our Northern Counties Committee suffered a severe loss by the death of Major Torrens—their Chairman for 20 years—but his place is being ably filled by Mr. Thomas Somerset, M.P. A vacancy on the Scottish Local Committee has been filled by the appointment of Colonel Norman Kennedy, the President of the Glasgow Chamber of Commerce.

On our Advisory Committee for Scientific Research, we have lost two original members by death. Mr. William Rintoul had long experience in the relations between the laboratory and the working business organism, and Sir Herbert Jackson, besides his great record as a chemist, had an unrivalled flair for experimental methods and general scientific synthesis. We are fortunate in getting in their places Sir Joseph Barcroft, F.R.S., and Dr. T. R. Merton, F.R.S., both pre-eminent in their respective fields. Last October the Government of India paid us the compliment of inviting our Chief Mechanical Engineer, Mr. W. A. Stanier, to form one of a Railway Enquiry Committee to examine the position of the Indian State-owned railways. During his absence his department is being supervised by Mr. S. J. Symes, our Chief Stores Superintendent, a trained engineer with long experience of locomotive construction and working.

### Results of the Year

For the fourth year in succession the results of the year show an improvement, for railway receipts expanded by £2,805,000. All traffics contributed to this, and we were assisted by the additional day due to leap year. The increase in first class passengers of £150,000 brings us back to a higher figure than in any year since 1930. Both this and the increase of £569,000 for third class passengers are due largely to a further recovery of long distance traffic and the creation of new traffic. Improved trade conditions were also an important factor, and this is reflected in the increase of £58,000 in workmen's fares. On the other hand, season ticket receipts were £18,000 worse than in 1935, our previous worst year. This is largely an indication of the growth in the use of the private car for short distance residential traffic, but is partly due to a change over from season tickets to the tickets we sell for business firms, under our bulk travel arrangements, which realised £648,000 last year, compared with £573,000 in 1935. Freight train receipts improved by the substantial amount of £1,932,000, of which £452,000 was from coal and £1,480,000 from other classes

of merchandise; the receipts from heavy industries improving appreciably from their recent low levels. A year ago I told you that, compared with 1929, we had suffered a decline of 14 per cent. in passenger receipts and of 18 per cent. in merchandise, the overall decline being 16 per cent. In 1936 the corresponding figures were 11 per cent. passengers, 14 per cent. merchandise, and 12 per cent. for all traffics.

### Railway Expenditure

Against this increase in railway receipts of £2,805,000 expenditure increased by £1,690,000, making the increased net receipts £1,115,000, or 40 per cent. of the gross increase.

The increased expenditure was made up of:—

Maintenance .. .. .	539,000
Operating (locomotive running and traffic expenses) ..	1,131,000
Other .. .. .	20,000
	<hr/>
	£1,690,000

The maintenance increase is almost entirely due to the growth in prices of labour and materials, the renewal provisions alone increasing by £184,000. The operating increase of £1,131,000 arose from the natural growth due to the additional traffic, together with the increase in labour and material prices. The year 1936 was notable for weather conditions which were unusually adverse to economical working. Fogs, snowstorms and floods in some parts of our wide system are, of course, normal incidents of a year's experience and expenses, but the working costs of 1936 were increased beyond the average to an extent that is probably not realised. The number of additional hours involved was 40 per cent. above the preceding three years' average, and a broad analysis of the *extra* expense of operation for overtime and other costs of delay and slow working, shows that it exceeded £200,000. In one period of four weeks when our gross receipts improved on the previous year by some £80,000, nearly the whole of this went in additional expense through weather conditions.

### Operating Statistics

Our statistics of operation have suffered for 1936 and under some heads are not so good as in 1935, though in all cases they are substantially better than in 1929. The assisting mileage or double heading required is down, owing to our more powerful locomotives, by 25 per cent. for passenger and 53 per cent. for freight trains. The engine miles per day per locomotive in use continue to improve and are 25 per cent. better than in 1929. In 1935 locomotive running and traffic operating expenses represented 49.0 per cent. of the receipts, but even with the increase I have mentioned, the 1936 outlay was 48.7 per cent. of the receipts. We, of course, provide regular services the whole year round, with the result that the ratio of these operating expenses to receipts varies materially during the year owing to the ebb and flow of traffics and to weather conditions. The railway service is "on tap" for the whole of the year and except for extra passenger trains on special occasions and a few goods traffics moving in train loads, it changes little in the quantity of facilities provided: unlike a road service capable of daily change in both its quantity and location. The elasticity in available railway capacity is of the utmost value to railway users, but it means that during the year the operating outlay has varied from about 40 to 55 per cent. of the receipts. Bad weather conditions bring out some of the ironies of life. Two passengers seated in a crowded carriage on a frosty morning were lately heard



bemoaning the fact that other passengers were standing. They then went on to discuss where each had succeeded in parking his car!

The railway net receipts of £13,252,000, an increase of £1,115,000, is our best result since 1929 and is a recovery of some £3,000,000 from the nadir of 1932. From the graph you will see that, reckoned as a percentage of 1929, the railway gross and net receipts (adjusted for rates) in 1936 have made an equal recovery.

On the other businesses I need say little, except that they show a net improvement of £33,000. Steamboats I might mention specially, for the results of these services are again the highest of any year and fully justify, if justification is needed, the recent expenditure on new steamers and the operating and commercial activities of the departments concerned. Our air services are giving a continuously higher standard of regularity and comfort, but need greater public support before they can be regarded as fully established. The whole position of air services in these islands now awaits developments upon the Maybury Report recently presented to the Government.

The remaining items show a reduction in total of £127,000, reductions of £80,000 in rents and £131,000 in interest being partly offset by improvements of £36,000 in Joint Lines, £26,000 in investments (mainly road transport) and £26,000 from our line in Northern Ireland, which has turned the corner and is once again earning net receipts. Overall the net revenue is improved by £1,021,000 and this has enabled your board to recommend a dividend of £1 5s. per cent. on the ordinary stock, the first for five years.

#### Net Revenues for Seven Years

I shall refer later on to the adjustment of the estimated overpayment of rates (£3,180,000) and its treatment in the accounts, but I would like at this stage to give you the net revenue figures for the last seven years, throwing back the adjustment of rates into the appropriate years:—

		Percentage of 1929
1929 .. .. .	17,175,283	100.00
1930 .. .. .	13,426,291	78.17
1931 .. .. .	13,320,080	77.55
1932 .. .. .	10,762,117	62.66
1933 .. .. .	11,561,025	67.31
1934 .. .. .	12,760,736	74.30
1935 .. .. .	12,997,967	75.68
1936 .. .. .	14,048,176	81.79

This table puts in true perspective our net revenue position and shows a fall of 37 per cent. in the first three years, followed by a recovery of one-half of the fall in the next four years. We hope to maintain and improve upon this by filling in still further the gap between it and that of 1929, although that year's results are by no means our ultimate objective.

#### Balance Sheet

Turning to the balance sheet, I draw your attention to the Rates and Rate Relief Suspense Account of £4,282,000. This represents the estimated amount due to us owing to the effect of the new rateable valuations, and since the close of the accounts the debt has been reduced to £1,377,000 by a further cash payment explained in the directors' report. This balance will gradually be liquidated as the valuations *in cumulo* are finally allocated, and the actual demand notes are corrected and adjusted. The cash and investment position is healthy at £32,000,000, and there is no likelihood of any new development which will require new capital issues in the near future. The Railway Finance Corporation

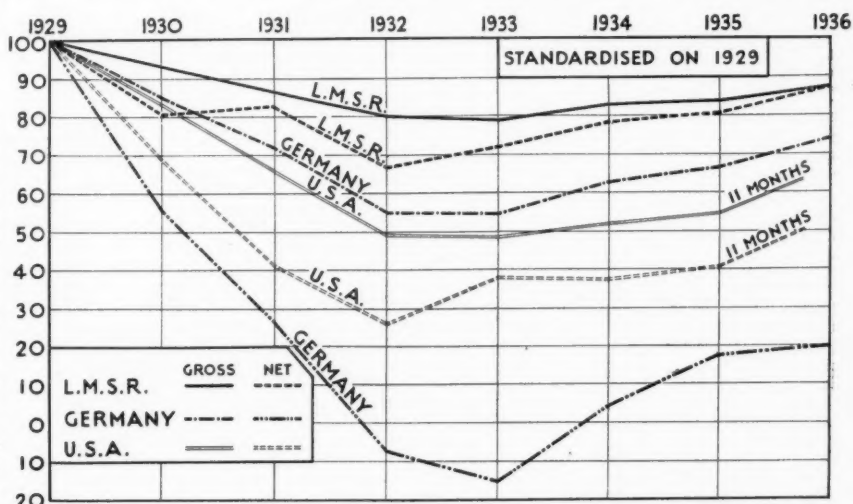
Loan will result in further supplies of temporary capital funds amounting to £6,165,000, making nearly £9,000,000 in all repayable by 1952, but even this we hope to repay without recourse to capital issues, unless some unforeseen capital development arises. As I have previously informed you, we shall not engage in any large capital scheme, such as electrification on a wide scale, without due regard not only to the probable return but also to the risk involved in new outlay on fixed plant, pending the ultimate relations of the railways and the public roads becoming clearer. I am asked to say something on the renewal funds position. These funds aggregate £13,065,000 and again going back to 1929 compare with £19,792,000 then. In the intervening period we have spent on renewals and re-equipment, not only the amounts provided currently out of revenue, some £33,000,000 and the special addition of £3,250,000 made this year, but also £6,727,000 of the accumulated funds, and we are very fully satisfied that this was a good investment. I should add that none of our revenue expenditure is suspended for future clearance and all displaced work and equipment has been written off currently where not replaced.

#### Rating Assessments

To my full account last year of the questions arising out of the revaluation for rating purposes, I need only add that we have been able to come to an amicable settlement of the valuations, *in cumulo*, for England and Wales, not only for the past five years, but also for the next five ending March 31, 1941. We have received 90 per cent. of the estimated overpayments into the Railway Freight Rebates Fund, but the corresponding adjustment of the payments to local authorities will be delayed, as the splitting up of the total valuations into the values in each local area will necessarily take some little time. We have already agreed with some of the local authorities concerned to spread the refunds over a short period, but for accounting purposes, we have brought in the closest possible estimate we can make of the total corrections of both rate and freight rebates fund payments to December 31, 1936. We made the necessary corrections in last year's accounts, and the £3,180,000 arrears relates almost entirely to the 3½ years from April, 1931, to December, 1934. I explained last year our intention to credit this correction to certain reserves which, if our revenue results in those years had been better would have been currently strengthened to meet our heavy programme for modernisation, and which were drawn upon extensively.

#### Road Competition

The general question of road and rail in freight traffic has advanced a little further in the year, not so much towards



Graph showing gross and net railway receipts of the L.M.S.R. compared with those of the railways of Germany and the U.S.A.

the attainment of an economic equilibrium as towards a point where the necessity for such a solution in the national interest is becoming still more obvious and imperative. The effect of recent legislation placing more equitable conditions upon the road industry has been to add materially to their costs, and in the effort to cover these costs by strenuous endeavours to add volume to the load, many smaller concerns have been cutting freight rates to an uneconomic point, and making the rates situation worse, at any rate, for the time being. The official committee which is now sitting upon the subject of hours and wages is uncovering the unsatisfactory and unregulated condition of the industry in this respect. On the other hand, the licensing system is establishing a rudimentary beginning of order and control. Meanwhile, the broad features of the uneconomic competition remain, some of them even aggravated—the ability of road hauliers to pick and choose traffics and to change rates and charge without any responsibility for transport as a whole is unaltered. It continues to wear down the upper ranges of that railway rates classification on which the industry of the country has been built up, for which it has declared its preference, but which it does little, sectionally, to preserve. The question of co-ordination of the two branches of transport in the public interest is now receiving active consideration by the Transport Advisory Council, but it bristles with difficulties, not the least of which is the multitudinous ownership in the road section, but we shall do our best to find a solution as soon as possible.

When the Salter Conference on Road and Rail Transport dealt with the problem, they considered that the licensing authority might help to remedy uneconomic competition by dealing with any excess in existing transport facilities through a reduction in the number of vehicles asked for, while safeguarding the public interest. This advice subsequently became reflected in the Statute of 1933 when the licensing authority was given power to exercise his discretion, having regard, *inter alia*, to the interests of persons providing facilities for transport, and he is bound to consider the objection of persons providing such facilities on the ground that suitable transport facilities would be in excess of requirements. It had been agreed that two years should be allowed as a transitional period during which the authority could study the road problem so that the question of objection to the granting of the original licences did not arise until the end of that period.

#### Railway Companies and "A" Licences

Thus the occasion for making such objections did not arise until recently, when the original "A" licences for the hauliers fell due for renewal. A great deal of misconception exists in the public mind as to why the railway companies took action under those statutory provisions. It has been regarded in some quarters as an unfriendly act towards the road transport companies, as an attempt to rob them of their legitimate rights. As a matter of fact, the objections were directed to cases where the traffics in question were of the character which had been originally and still were on the rail, where the rail facilities were substantially equivalent and ample, and where the length and directness of the haul put the peculiar advantages of road service at a minimum. On the whole, the apparent attack by the railways was really only delayed defence—delayed by the slow movement of the legislature—and you all remember the zoo label: "This animal is wicked, it defends itself!" We felt that the new statutory provision should not be allowed to go by default as a mere gesture of friendliness to the road hauliers or willingness to co-operate in a solution of the problem, eager as we are to show both those qualities. It must be presumed to mean something in practice, and it was our clear obligation to the shareholder, the railway users, and the staff, even perhaps the legislator, to find out what. We considered that we had no option but to ascertain its value in practice, otherwise we should have been open to the charge that we had neglected to use a means, publicly provided, for helping to clear the issue. I would remind you that after it had passed through the House of Commons, the Minister in explaining the Road and Rail Traffic Bill on Second Reading in the House of

Lords said it gave effect to the principal proposal of the Salter Conference, that the granting of licences would be against the public interest if it were considered that existing transport facilities suitable to meet the public requirements to be served by the applicant were already sufficient.

#### Railway and Road Law

An important feature in comparing transport facilities provided by rail and road is the railway law governing charges, publication of rates, equality of treatment summed up in the words "non-discrimination," obligation to carry and the other varied regulations applicable to a public utility company performing a comprehensive public service. Apparently the road law means that where facilities provided by road are in fact used by those who select that means of transport for particular consignments, that and that alone is the test of suitability and adequacy. As a result, then, the appeals show that if the statutory provisions have an application at all it is within a range of actual circumstance so narrow as to be of no practical importance. It seems to me that whatever they may do for regulating future extensions of road transport, the position as it stood in 1936 is unlikely to be effectively altered, and we cannot rely upon them to remedy the confusion or damage due to the unregulated conditions up to date; and also that practically equivalent services are unlikely to be brought into the picture in order to determine adequacy or excess, so long as there are those differences of detail which generally exist between road and rail services. The provisions in question may indeed serve to prevent undue competition between road hauliers themselves, but so far as railways and the competitive long distance trunk services are concerned, it is difficult to conceive the precise practical conditions in which, under the present rulings, those provisions will be applicable.

#### Real Equality Wanted

Although the Act provided that the licensing authority in exercising his discretion should have regard primarily to the interest of the public generally, the tribunal decided that it was not the intention of the legislature that the licensing authority, in exercising his discretion, should have regard to the question of rates; further, it was not their duty to make any classification of goods to be carried by rail and road respectively, nor was it their duty to consider the question whether it was in the national interest that the existing railway facilities should be more fully employed than at present. All these points had been fully brought before the licensing authority by the railway companies as being material matters for consideration. The tribunal said that the railway companies must have these matters dealt with elsewhere. If the legislators had the intention of introducing an element of control or beginnings of co-ordination or removal of past inequity, they can only be regarded as having attempted what has turned out to be ineffective. The attempt has been put to the only possible test, and we must now renew our efforts to secure the highly necessary co-ordination of road and rail function in the public interest, by co-operation in regard to rates and whatever other means suggest themselves. We have every desire that road transport should take the place for which it is economically suited, and stand by the principle which I have so often stated, that when the conditions and regulations governing the respective forms have been as far as possible equalised, we are ready to let the division of traffic settle itself upon purely economic lines, subjecting, however, the particular interest of sections of the community to any overriding considerations which may be necessary in the interests of the country as a whole. So many extraordinary views are current about the railway companies' action in this matter that I hope I may have cleared the issue somewhat. I might mention, however, that the House of Commons was recently informed by a Member of Parliament that the railways had entered wholesale objections to the granting of goods vehicle licences and that they had employed King's counsel in every case. This is not correct, and as a matter of fact we have lodged and pursued objections in about three per cent. of the applications for renewal of "A" licences, and in only three of these was a King's

Counsel employed in each because of difficult questions of the interpretation of the law.

### Views of Sir William Beveridge

The whole policy of road regulation under this Act has just been challenged from a different angle, that of war conditions. Sir William Beveridge would have no such restrictions on the expansion of heavy road vehicles to fit the economic conditions of peace, because freedom from all restriction would be an additional safeguard in time of war. The Act should, therefore, he thinks, be revised in the light of war policy. Now a stiff price can properly be paid for war preparation in time of peace. But that price ought to be paid by the right people, and that price for wartime ought never to be chaos in peace time. There is no reason why a national war insurance should be paid solely by railway shareholders and the coal and heavy industries and the other road users. Moreover, anything that weakens the railways financially (and, therefore, physically) in time of peace is a far greater risk in time of war, than can be made good by a mere surplus of road vehicles. Sir William Beveridge has the wrong end of the stick in this matter. In an emergency he wishes to invoke the potential surplus of expansion, but though it is of crippling importance in time of peace, it is quite small in relation to the main corpus of 450,000 vehicles in the country (about which little question arises), and the number in question by Sir William would be available by mere deflection from other uses. He has remedy and disease in the wrong proportions.

I do not propose to discuss in public our plans in the event of bridge damage and the allied question of alternative railway routes, except to state that I totally disagree with the suggestions I have read. Neither do I propose to discuss in public the vulnerability of road bridges. Experience shows that the skeleton emergency service possible for a week of an industrial dispute, teaches us nothing about the full-bodied, long-period requirements of war. Considering the problem from a national aspect, visualise the position if the transport output of the railways with their great flexibility to meet exceptional demands, were thrown on to the highways. Strings of lorries, with, of course, a driver for each, would attempt to take the place of trains averaging 34 wagons of 12 tons capacity and moving 50,000,000 ton miles of freight a day, while many cars, buses and coaches would attempt to cope with the 60,000,000 passenger miles a day now being dealt with by railway together with the immense milk, fish, mails and other express traffic carried in passenger trains. The result would be hopeless congestion, no matter how the road system were vastly extended, and cause a greatly increased demand on man power. Only a railway can provide the capacity and average speed necessary to bear the brunt of the nation's essential traffic requirements, and recollect that in this country it relies on *home-produced* fuel and not imported fuel. It is clear to me that the framework of the country's transport must be formed by the railways, if economy and efficiency are the tests, and to me it is also clear that this is of even greater importance in times of war than in times of peace. A policy of sapping the railways in times of peace, whether by legislative or administrative action, will be to the nation's detriment in times of war.

### Reconstruction of Euston Station

Last year I told you that we were proposing to rebuild Euston station under the Railway Finance Corporation Loan Scheme. The directors have appointed Mr. Percy Thomas, the President of the Royal Institute of British Architects, as consulting architect to co-operate with our engineer's and architect's departments in the preparation of plans and designs for the new terminus. The scheme will involve the demolition of all the buildings between the station and Euston Road in order to enable the platforms to be lengthened and the erection of new station buildings, an hotel and a block of offices in a new alignment. The internal accommodation of the station, including the concourse, booking office, waiting rooms, refreshment rooms, cloakrooms and other amenities will be planned within the east-west limits of Seymour Street and Melton Street. The proposed plans locate the new

parcels offices for dealing with both outwards and inwards traffic and the mails at the north end of the station, such traffic to be worked to the platforms by means of an overhead bridge, minimising contact with the travelling public and removing a source of present inconvenience. Considerable progress has been made with the details of the planning, and it is hoped to begin the work during the present year. In fact, the important consequential rearrangement of our marshalling and train equipment facilities at Willesden is already in hand. When the reconstruction is complete, Euston will be a worthy replacement in modern times of the present station, which has existed with various adaptations for just a century.

### Re-equipment

I should like again to refer to the large programmes of re-equipment which your board have undertaken in recent years. They were an indication of our confidence in the future and part of a deliberate policy of rationing our resources to the best advantage on a close examination of our probable physical requirements and in the light of modern methods and many wide experiments of our own. These reasons have fully justified what we have done, and the fact that some £60,000,000 was spent in the seven lean years, when employment in the heavy industries was poor, had an undoubted national value, judged by the latest and approved principles of the economics of trade booms and depressions. Incidentally we are the gainers by having so largely re-equipped during a period of comparatively low prices. Few outside our organisation realise the extent of the work done since the amalgamation. New rolling stock and works, including our 1937 programme, represent no less than £140,000,000, including 3,450 locomotives, 12,800 carriages, 169,000 wagons and 7,500 miles of railway track. If you were to deduct from our total capital expenditure the cost of land, cuttings, tunnels, &c., to get the capital represented by renewable railway assets, you would find that a very respectable proportion has been wholly renewed in late years. On rolling stock generally we are ahead of our normal requirements, and while there will no question of relaxing our physical standards we shall have appreciably less renewals to meet for some years after 1937. Permanent way renewals fall in more regularly and, whilst it is sometimes difficult to perform them without interfering with train working, all requirements have been fully met and during the lean period we exceeded our normal expectation, and the line is in excellent condition.

The whole of our important fleet of steamers on the Irish services has been built since the war; we have anticipated replacements and do not expect to go into the market for new vessels for some time. For reasons explained some years ago, we have not done very much on major building reconstructions apart from bridges, although there has been a steady stream of minor works. As you are aware, we have a fairly heavy station programme in hand, including the difficult one of Euston I have mentioned. I must refer again to our renewal provisions, which are continued in good years and bad years alike. They are affected by prices and quantities and this year have been increased by £200,000 to £5,025,000. This is not, of course, the total money available for renewals, as credits totalling to over £1,000,000 per annum are obtained on replacements. Our Works and Equipment Fund is a "sweeping up" fund for works not provided for by specific funds and was formed from various funds of the pre-amalgamation companies, plus £180,000 per annum provided out of revenue. It was approaching exhaustion until replenished this year by the £1,750,000 from the rates arrears as mentioned in the report; in addition, the charge to revenue has been increased by £100,000, and it is proposed to make further additions out of revenue annually for a few years so as to put the fund beyond the need of extraneous help.

### Welding in Rolling Stock Construction

Considerable progress has been made in the fabrication of carriages by welding. Up to the present, 113 vehicles have been fitted with fabricated underframes, and by the end of 1937, 384 vehicles will have been dealt with in this manner,



in addition to 120 bogies manufactured by this process, and by the end of the year the number will be 595. Five hundred and thirty-one vehicles have been fitted with welded panels, and in 1937 a further 391 vehicles will have been so fitted. Body panels are welded into continuous panels from doorway to doorway, varying in length from 4 feet in the case of non-corridor vehicles to 46 feet in the case of corridors. One complete roof panel is welded direct to the body frame, as compared with 17 separate panels previously. These processes add strength to the vehicles and obviate trouble previously experienced with the paint film breaking owing to slight movement of the body. A further result is a reduction in weight of 20 to 86 lb. per seat, according to the type of vehicle, and in sleeping cars a reduction of 1 cwt. per berth. On the freight side 62 brake vans have had the end framing fabricated by welding and 36 covered goods vans have been fitted with welded underframes. In continuance of the policy many components are also being manufactured by this means, and during the past year the number so produced for vehicles was 312,000.

#### Permanent Way

I should like to mention also the consideration we have given to the question of permanent way construction. Here also welding has passed the experimental stage in dealing with worn-out points and wing rails. Twenty-two electric welding sets are now in use and last year 3,500 crossings were built up by this process, securing an 80 per cent. addition to their life, but a more important advantage is the fact that the special wear and tear at points can thus be made good without taking out a worn crossing and installing a new one, so reducing appreciably the interference with train movements. We have also welded sections of rails into 500 feet lengths as an experiment, and careful records of expansion and contraction stresses are being kept to obtain data as a guide to future policy. In tunnels where there is little variation in temperature our experiments have already noticeably reduced the noise at the rail joints. A further experiment in hand is the rolling of bull head rails in lengths of 120 feet, and we have also laid  $5\frac{1}{2}$  miles of track with flat bottom rails of 110 lb. per yard, a type we have not tried in England in recent times, although we have done so in Ireland, and it is, of course, almost universal abroad.

Chromium and other alloy steel rails have also been laid on five sections of the line subject to exceptionally heavy strain caused by retarding or stopping trains. These various rail experiments and others connected with the rail fastenings, chairs and sleepers are kept under close observation, so that the results under various conditions will form an accurate guide to track policy. Methods not only for construction and renewal of rails, but also of current maintenance of track are under constant scrutiny. After careful trials, we are adopting systematic and measured processes for packing ballast under the sleepers, in place of the shovel packing system, which some may look at with regret as being yet another instance of supplementing or superseding the personal art of the individual by the impersonal formula of science, but it will produce a higher standard of maintenance.

#### Speed of Trains

We are justly proud of the high standard of our track upon which so much depends, and while no change is made without practical tests under our own conditions, the effect of the changes introduced has been material, alike for engineering efficiency, economy, and capacity for speed. The last factor is the one which attracts most interest, as the public assumed the first and don't trouble about the second. Speed of trains, whilst obviously largely governed by considerations of motive power capacity and train weights, has an overriding control set by the character of the track and its alignment, and where these are capable of being improved without disproportionate outlay, that is being done to meet modern demands, not for a few of the 28,000 trains we run daily, but for the service as a whole. Where, however, there are necessary restrictions on speed, whether temporary or permanent, due to curves, reconstruc-

tion work, siding connections, signalling limitations and so on, these will be maintained as we run our trains to existing track circumstances. I see references in the press to highway accidents being due in a large part to roads provided for one purpose being used for another. The intersection by-road, the short radius corner, the provision and sighting of warning signs, the nature and camber of road surfaces have all their counterparts, with different names, in railway tracks, but there is this contrast, that while they exist, the various precautions necessitated by them are also enforced. Just, however, as some country lanes designed for horse vehicles will probably never be converted into first-class motor roads, we have various portions of track built for sparse traffic which will probably never justify improving to express train conditions.

I have dealt with this at some length to make clear to you that apart from the exceptional restrictions I have mentioned, which do not materially affect our main lines, we could, if we had no other trains to consider, very appreciably increase the speeds of particular passenger train services between the large towns on our system. But these trains represent only a small part of our mileage, and we must give due weight to the heavy suburban traffics, the pick up main line passenger trains, the express goods trains and the slow mineral and goods trains.

#### Improved Scottish Services

We recently ran an experimental train to Glasgow and back to examine the possibilities of late afternoon services. In its double journey it achieved a record and it very fully justified our anticipations in regard to locomotive ability, track conditions and passenger comfort, but it affected the working of 126 other trains. Since then we have made a further close examination of the traffic on that section and have reluctantly come to the conclusion that a rapid service in the later afternoon could not be justified, owing to its interference with the working of so many other trains which could not be retimed without considerable inconvenience to the public and loss of efficiency in the services to our customers. We are, however, proposing from this summer to run a new and special London-Glasgow service each way, leaving about 1.30 p.m., stopping at Carlisle only. This will permit a rearrangement of other Anglo-Scottish trains which will, in turn, considerably improve the day-time services between the Midlands and Scotland and provide better day-time services from Inverness to London. The stop at Carlisle has certain working advantages which outweigh the glamour of a 400-mile non-stop run, and with this, and to allow a margin for contingencies, the trains will be scheduled for  $6\frac{1}{2}$ -hour runs. I ought perhaps to add that there is no question of reviving the East and West coast racing rivalries of 40 years ago. We and the L.N.E.R. Company co-operate for the public advantage, and while our problems and methods differ, there is a constant interchange between us of ideas and proposals.

#### Scrap Material

Several years ago I mentioned that special inquiry was being made into the methods of reclaiming scrap material. It necessitated prolonged metallurgical tests and investigations in order to see how far it was economically possible to make a greater use of scrap in our own works and also by test sales to ascertain comparative prices based on intrinsic values of the materials sold. The various classifications for metal scrap of all descriptions amount to approximately 377, and for a single year the total ferrous scrap produced was 389,000 tons and non-ferrous scrap 14,960 tons. Fifty-six per cent. of the non-ferrous and 33 per cent. of the ferrous were utilised in the company's works, the balance being sold.

As the recovery equipment for dealing with brasses and bronzes was only brought into operation recently, it is anticipated that the amount of non-ferrous scrap renovated for the company's own use will be materially increased. Tests on the market have shown that the fact of melting into an alloy such metals as tin, lead, antimony, &c., reduces the intrinsic value to approximately 83 per cent. of the metals in their virgin state, hence the advantage to the company of bringing back their scrap metals to standard by renovation.

As a result of these investigations a great deal more ferrous scrap is being used in the company's works; thus in the manufacture of chairs for the line where in 1931 it was the practice to use 65 per cent. scrap and 35 per cent. pig, today 93/95 per cent. scrap is being used with satisfactory results. The economies which accrued, based on the scrap produced and prices prevailing at the time, amount to £55,895 per annum, and only a modest capital expenditure has been involved.

### Modernisation

I have mentioned in previous years the varied ways in which the burden of costs, and its allied question of operating efficiency, is being attacked unrelentingly and systematically. An annual report is only one chapter in a continuous history, to be read in conjunction with all the previous chapters. I will, therefore, take only two particular points by way of illustration. The first is the modernisation of goods sheds. Two years ago I mentioned that we were experimenting with new methods for the handling of traffic at goods depots to reduce operating costs. Considerable progress has since been made and approximately £150,000 has been authorised for structural alterations at depots to enable improved methods of working to be introduced. In addition, it has been possible to adopt revised methods of working at other terminal depots without structural alterations. While the primary object of these improved facilities is to enable traffic to be handled more expeditiously, they have also justified themselves financially, and these changes are gradually showing themselves in our costs. In three typical instances where goods depots have been modernised in this way, each representing a yearly handled traffic of 35,000 to 50,000 tons, the time taken in handling a ton of traffic has been reduced by 43 per cent. at one station, and by 32 per cent. in the other two cases.

The second is the improved organisation of our motive power depots. While our progress in the reduction of engine casualties is the result of various improvements, this particular factor has been very important. In the past three years the mileage achieved per engine casualty, based on the L.M.S.R. stringent formula for casualties, has shown an increase of 25.7 per cent. for 1935 compared with 1934; of 21.4 per cent. for 1936 compared with 1935; and 52.6 per cent. for 1936 compared with 1934, which is what Wall Street would call "a new high."

### Hotels

The general business in the hotels improved during 1936 with one or two local exceptions. The restaurant car service in facilities and in profits has also shown advance. Several of the larger refreshment rooms and the St. Pancras station catering arrangements have been remodelled and the appreciation of the public shows itself in increased earnings. A considerable scheme of remodelling of the greater part of the ground floor of the Midland Hotel, Manchester, is in progress in order to keep this very important hotel abreast of other first-class hotels. The building of the new hotel at Leeds has progressed and is so far advanced that the rooms are actually taking shape, but it is difficult at the moment to name the date of the opening. The original hotel at Kyle of Lochalsh has now been completely rebuilt, and the additional business during the summer and autumn after the reopening compensated for the loss of business during the closed period. A garage is being built adjacent to the hotel, which will supply an amenity for the growing tourist traffic to the Isle of Skye. The development of this wonderful area of the Western Islands for holiday makers, which we have pursued through our interest in and by the forward policy of MacBraynes, has received a definite impetus in the past few years. The policy of modernisation of other hotels has been continued.

### Catering at Johannesburg Exhibition

Our resort hotels, of world renown, continue to attract visitors to this country from abroad, and so to make a definite contribution to our balance of trade position and facilitate the maintenance of the sterling exchange and, therefore, of our export industries. In this connection, two

events in the past year are worthy of special mention. At the request of the South African authorities, we undertook the complete charge of the catering arrangements at the International Exhibition at Johannesburg which began last autumn. The Bien Donne Restaurant, a copy of the famous du Soleil Restaurant at Gleneagles Hotel, quickly became a great centre of attraction, not only in the exhibition itself, but also for the Johannesburg residents, and it established a new standard for catering amenities in South Africa, receiving the highest praise from the public and exhibition authorities and undoubtedly giving the visitors from all parts of the world a new reminder of the position of Great Britain as a centre to be visited. On the financial side it was a great success, the whole of our costs being met, and a surplus accruing to the exhibition authorities. The second event is the reduction of the American visa charges. We have been associated with other transport interests in making representations to the Government for the removal of the charge of \$10 made to American citizens for a visa to enter this country. Unsuccessful for some years, we made yet another effort, and I was one of the deputation to the Government on the question, and was able to urge the experience of the Railways' New York office as to the true effect of this onerous charge on the overriding importance of widespread Anglo-American understanding—this tax on contacts. The Government announced in December that the visa fee will be reduced from \$10 to \$2 on and after April 1, 1937. We are sure that this reduction will further encourage visitors from the United States to this country.

### Staff Educational Facilities

We are constantly engaged with the problem of making our vast and scattered organisation keener and more efficient, of seeing that the most junior and most isolated worker is not only conscious of the importance of his job in the smooth working of the system and the level of public service, but also that he has every opportunity of knowing where his methods and ideas can be improved. The cinema film has proved of great value in this connection. Our topical and descriptive films quicken the general interest, and the instructional film quickly but effectively influences the mind through a more welcome channel than vocal correction by officers and inspectors, although the chaff between fellow workers is often vocal enough and doubtless effective. The films include passenger station working, goods station working and salesmanship, and the inferior methods of working are first shown, followed immediately by the better methods. Hitherto these films could be shown to large groups in the bigger centres in appropriate halls, but we found it difficult to reach the scattered servants in less populated areas. But we have overcome this limitation by providing a moving film theatre, inexpensive in working, which goes from point to point giving small groups the same facilities. For this purpose an old passenger-carrying vehicle has been adapted and fitted with sound film reproducing equipment. This travelling cinema commenced its journey in November last, and during the first two months 134 exhibitions were made to over 4,000 members of the staff. Our various other film activities for both public and staff purposes were continued and extended during the year, and have proved most successful.

The spirit of emulation, and enquiry into the way to the best results, is promoted in the Operating and Commercial Departments by special domestic journals, which record personal and regional achievement, especially in the wide-embracing competitive schemes which make all parties conscious of their interdependence, and also of the individual part they play. We have found these of great psychological importance. In borrowing the idea of league tables and procedure, the spirit of sport has once more come to the aid of business. There are, of course, widespread facilities of various kinds for education in transport matters for our staff, in university and other classes for different examinations. These have been tried and tested over a period of years, and equip the various grades with a good basis for their work. But with all this there are still large areas of railway practice in which the communication of ideas has not been systematised. A stationmaster in a

particularly difficult situation may have been progressive and imaginative beyond his fellows and made a particular success of his task. His ideas and influence extend to the few who happen to have been in personal contact with him, and they, in due course, scatter and perhaps act as small centres in the dissemination of these methods. But from the other and more numerous "neutral" centres, the standard of older ideas is equally propagated, and the promulgation of the best practices, which cannot be theoretical, but must be by personal contact, is slow and unsystematic.

#### Derby Staff College

You will, no doubt, have read the announcement that the company have decided to open a staff college at Derby, for the better and quicker training of the staff in an instructional centre where training can be given in the best practices known in the railway industry. The fundamental idea is that the men shall be trained at a boarding staff college rather than at what might be termed a day college, at which those of various grades and from various areas will work and have their recreation together, an arrangement that will tend to break down any tendency to a purely departmental outlook, which is a potential danger in all big organisations. Derby has been selected for the site of the College because of the railway activities centred there, and its accessibility to all parts of the L.M.S. line. The presence there of the locomotive works, carriage works, marshalling sidings, control offices, laboratory, &c., will enable the students training at the college to have first-hand knowledge of actual workings by practical demonstrations, and acquaintance with the difficulties which are apt to arise. No amount of reading or discussion can give a man the knowledge of a machine which seeing its parts assembled will supply—the valve gear of a locomotive for instance.

#### Appointment of Colonel Manton

Colonel Manton, D.S.O., has been appointed Principal of the college. He has had a distinguished career in the army, and relinquished the post of Chief Engineer, Malta, to take up his new position. His work has been largely connected with transportation and, latterly, with the training of Army personnel, so that he comes to the L.M.S. with a wide knowledge both of railway transport and of those very principles of staff training which are involved. The remainder of the tutorial staff will be selected from the existing personnel of the company, and they will be supplemented by lecturers drawn from a panel of those with wide experience in the many specialised activities of our service. A short period of experience in the centre will, it is hoped, be prized as an opportunity and become an essential element from time to time in the career of all who can benefit by it.

As a further element in securing a broader general training for employment in the higher posts—always a great problem—we have made a continuing arrangement with two American railroads to exchange selected staff so that each may benefit from the experience. At the present time we have one man working on the New York Central and one on the Pennsylvania Railroad, each being given a course of training in American railroad methods, and on our part we have one man from each of these two companies who are receiving training on our line.

#### Wages

In 1935, the three railway unions asked for the restoration of the remaining  $2\frac{1}{2}$  per cent. "cut," and for the restoration of the old rates for night duty, overtime, and Sunday duty, which existed prior to 1931. The negotiations continued till June, 1936, when the N.U.R. and R.C.A. decided to carry their claims to the Railway Staff National Tribunal, but the A.S.L.E. & F. put forward new claims for improved conditions of service for footplate staff and engine cleaners, which included a six-hour day, payment at the rate of time and half for night duty and overtime, payment at the rate of double time for Sunday duty, and 12 days' instead of six days' annual holiday with pay. The claims of the N.U.R. and R.C.A. were heard by the tribunal in July, 1936, the third union not being a party to that hearing. As a result the tribunal unanimously reduced the  $2\frac{1}{2}$  per cent. deduction

to  $1\frac{1}{4}$  per cent. and increased the overtime payment from time and one-eighth to time and a quarter. The decision applies for at least a year from August, 1936, and was adopted for all the grades affected. The change from  $2\frac{1}{2}$  to  $1\frac{1}{4}$  per cent. deduction also applies by agreement to railway shopmen. The total cost to the company is estimated at £553,000 per annum.

In December, 1936, the tribunal found against the further claims of the A.S.L.E. & F., who have since considered the decision and intimated that they are not prepared to accept it. Further discussions between the society and the companies have taken place and have been adjourned until early in March, when the accounts of the four companies will be available. Our average number of staff employed increased in 1936 as compared with 1935 by 3,100, but at December 31 our staff was 6,841 more than at the same date in 1935. With the growth of work and the increase in the rates of pay, our labour bill for 1936 was a little over £1,000,000 greater than in 1935.

#### Outlook

I have little time left to consider the future. The year 1936 in the final event was rather better than my restrained optimism a year ago estimated. I see no reason why 1937 should not be a still further advance, and this should reflect itself in our gross receipts. But whereas our receipts per unit of work done do not rise, but may be even still further depressed by competition, our costs per unit of work done are going up. For example, on material purchases alone we can see three-quarters of a million additional in price advances. Although economies in methods of operation will continue to fructify and to offset this factor to some extent, it is becoming increasingly difficult for us to get back to a figure of net receipts, compared with 1929, on a gross traffic volume equivalent to that year. But in the way in which our recovery is taking place we can compare with the railways of any other countries of the world, though many of our difficulties are greater, and our officers and staff deserve the thanks of the shareholders and the public for the zeal with which they have pressed along the road to recovery.

I now move that the report now read, with the statement of accounts, be received and adopted.

Mr. E. B. Fielden (Deputy Chairman) seconded.

#### Stockholders' Remarks

Councillor Wilson (Accrington) wished first to congratulate the Chairman on his speech. They had seen an illustration of energy, patience and imagination that had not been tied down to office hours. He was glad to find that the company was opening its own booking offices in the Manchester district and saving the stockholders 5 per cent. on many thousands of pounds, and he hoped that this practice might be extended over the entire system. He advocated, for the sixth year in succession, the ratification of a 1d. a mile single fare. The main reason for their not getting any ordinary dividend for so long was that their road competitors were not common carriers.

Sir Charles Stuart Williams thanked the Chairman for his exhaustive and illuminating comments upon the events of the year. He was gratified to notice the substantial increase from £10.7 millions to £11.9 millions in the amount at credit in the savings bank of the employees. With regard to the average rate of pay, even as compared with the year 1919—a year of difficult and even extravagant prices—a driver was now getting 42 per cent. more than in 1919, and the firemen and cleaners 51 and 35 per cent. respectively more than in that year. He thought all stockholders felt that the wages question which was always hanging over their heads should, if at all possible, be settled on terms which should have permanence for some considerable time, and which would bring the stockholder and the employee together in some common bond. Regarding road competition, some action was called for in respect of C licences which, he understood, were responsible for roughly two-thirds of the traffic on the road. Again, the terrible toll of fatalities on the roads should not be standardised at the present annual level of 5,000 deaths and 250,000 casualties. This was not the time to spend £100,000,000 on the roads. Sir



William Beveridge had made the point that a railway could easily be bombed whereas a system of roads could not. There were on railways alternative routes, but, even if there were not, he would guarantee to make good any damage to a railway long before any county council could make good a road.

Mr. Leslie Boyce, M.P., congratulated the Chairman on being able to place before the stockholders accounts for the past year which showed a net increase in receipts of £1,115,000 and enabled 25s. per cent. dividend to be paid on the ordinary stock. Further legislation was necessary to provide for the regulation of the freight rates to be charged by road transport services. Every Member of Parliament should have sent to him a reprint of the Chairman's remarks on road competition, and every stockholder in the main line railway companies should write to his Member of Parliament and ask him what he was doing on the subject.

Mr. Van Sommer said that in the balance sheet Government securities were put down as £20,700,000 in 1936, against £19,100,000 in 1935. If the difference of £1,600,000 came out of earnings ordinary stockholders should have the benefit of it. As the ordinary stockholders had gone for many years without any interest upon their money he suggested that the board should give them an equivalent in a certain amount of mileage money in addition to a dividend.

Mr. Z. Burkhill advocated the adoption by the company of a patent locomotive lubricator designed by an employee, which, he claimed, would lead to considerable savings.

Mrs. C. C. M. Smith expressed her appreciation of the staff with whom she was frequently brought in contact in the course of her travels. She deprecated taking down the hedges in the rural districts, and asked that a suggestion box should be provided at each station.

Mr. E. C. McAdam considered that the directors had thought more of the renewals of stock, and so on, than they had of the ordinary shareholder. The £3,000,000 odd placed to reserve in successive years for spending on renewals had been earned by the company, but paid at the expense of the holders of the ordinary stock and the 1923 preference stock. If the ordinary stock had been given 2½ per cent. it would still have left a very large sum for renewals. Expenditure on renewals should be eased down a bit. He contended that the increase of £9,000 in the profit on hotels was not accurately shown, and that the profit was actually £31,000 less than that for the previous year.

Lord Lamington advocated the adoption of the 24-hour system by the railways as being likely to benefit them considerably, as well as the travelling public.

Mr. E. H. Greg asked if reliable statistics could be obtained as to the cost of making and maintaining a road versus a railway per ton-mile carried. He was increasingly concerned with the weight of the coaching stock compared with the number of passengers carried. As to the Midland Hotel at Manchester, he did not see any real improvement, and the temperature was appalling.

Mr. E. S. Dixon wished to know what rate of interest was borne by the savings-bank deposits, where that rate of interest was obtained from, and whether the working of the savings bank fell back upon the revenue of the company.

#### Chairman's Reply

Councillor Wilson has conveyed a wealth of useful information, and we are very grateful to him for it. The policy with regard to ticket offices is an economic question at each point, and you may be quite sure that we should not pay out any commission in these cases, if we felt that we could do the work ourselves equally well; but to set up a rival place at each point would be uneconomic. We always have them under scrutiny. We are also grateful to Sir Charles Stuart Williams for his comments.

We will carefully note the suggestions made for further action upon the Salter Report. As far as it went that report was a great step forward, and we are sorry that the recent attempt at legislating for it has not been more successful. But we go forward to the next stage and will no doubt follow many of the points that Mr. Leslie Boyce has put before us. If, when they take the form of a Bill, he gives the same advocacy in the House as he has

been able to give here today, we shall be assured of success. Then, I have been asked why the increase in the Government securities shown in the accounts has not been brought through the revenue account. It cannot be done by law or accountancy or common-sense. Those are capital funds, and they cannot be used for revenue purposes. Our Government securities go up and down with the funds that we have in hand, but they fluctuate quite independently of any considerations of the profit that we are making. In the same way it is not possible to pay shareholders in kind, as it were, in lieu of dividends. It is not legal.

Mr. Burkhill had a good deal to say to us on a patent lubricator. We not only encourage and welcome all suggestions made by our staff, but we always endeavour to give them a fair deal in connection with them, and if this patent lubricator is all he claims for it, he can be quite sure that it receives very careful consideration by our engineering staff. We have, however, our own design, for which I think we can claim a good deal. I believe it will run from London to Glasgow without any attention from the engineman.

Mrs. Smith expressed a note of appreciation of the staff and all their efforts, which I was very delighted to hear. I am not quite sure that we can go all the way with her on the subject of hedges. There are very important considerations of costs and maintenance in connection with the protection of the line which make that not always practicable. Then, with regard to the suggestion box, if she will guarantee that no other rubbish gets put into it, we will consider it. I think that a suggestion received in writing at Euston from a box is much less likely to be attractive than one put personally to the stationmaster on the spot.

Mr. McAdam asked, quite naturally, why this £3,000,000 of windfall did not come some way towards the ordinary stockholder, but went into reserves. I invite him to look at the table that will be printed with the speech showing what the profits of the company would have been in those years if the rates had been properly paid in accordance with the final decision, and he will find that in no year would it have made the slightest difference to the ordinary stockholder. Even in the case of the preference stockholders, if the profit had been higher in those years, a greater appropriation must have been made to the various renewal funds. If he will compare the year 1936 with the year 1929, he will find that out of some £8,000,000 odd down in gross receipts, we were only £2,000,000 odd down in net receipts, and that some £6,000,000 in between that has been saved. About £1,500,000 of that saving was due to the ordinary course of working and prices, but there is at least £4,000,000 that could be attributed to better organisation of work. That represents a much greater contribution to stockholders than anything we might have done by way of deflecting this particular windfall from the rates.

In some respects our renewals fund will be less drawn upon in the future for dividends in particular than they have been in the past; but it does not make the least difference to the revenue account, because we charge an equated annual figure to the revenue account, and not the renewals fund, for a particular year; so that the renewals fund is scientifically calculated to keep the various assets to which those funds apply in their proper state. That is a calculated amount, according to price and life and wear. I can assure Mr. McAdam that the hotel accounts are fully loaded for the appropriate expenses, and if the accounts say a profit has been made, it has been made.

Lord Lamington has dealt at some length with the attitude of the railways towards the 24-hour system. They have never been opposed to taking their share in any change of public custom or attitude towards this problem. But although we have told the various interests from time to time that we are ready to take our share in making this change, we are not prepared to force it upon the public ourselves.

We have not got the particular statistics as to the cost of a road for which Mr. Greg asks. We have led the way in this country against the world in keeping the weight of stock per passenger carried to a reasonable figure with the welding and fabricating devices, to which I have already referred, and with the use of appropriate materials. I am

disappointed that Mr. Greg does not think that the improvements in the hotel at Manchester are adequate for his purpose. We are still in the middle of them, and we are conditioned in the replanning by the general structure of the hotel. I hope the excess of heat will not be a permanent matter.

The savings bank funds put up by our staff of workers (a movement that we certainly encourage) provide ordinary working capital in the business, and make a good return for us. The rate of interest obviously cannot be altered from day to day or even from month to month; it is not the practice of large institutions frequently to alter the rates. Our rates vary according to the amount put in from 4 per cent. down to 3 per cent.

The resolution regarding the adoption of the report and accounts was put to the meeting and carried unanimously.

The Chairman then moved: "That final dividends for the year ended December 31 last be hereby declared (less income tax) as follows: £2 per cent. upon the four per cent. guaranteed stock. £2 per cent. upon the four per cent. preference stock. £2 10s. per cent. upon the five per cent. redeemable preference stock (1955). £2 per cent. upon the four per cent. preference stock (1923), and a dividend for the year of £1 5s. per cent. on the ordinary stock."

The Deputy Chairman (Mr. E. B. Fielden) seconded the resolution, which was carried unanimously.

On the motion of Sir Alan Anderson, seconded by Sir Thomas Williams: Mr. Samuel Richard Beale, Mr. Charles Booth, The Rt. Hon. The Viscount Clanfield, Mr. Edward Brocklehurst Fielden, Mr. Joseph Bruce Ismay, Sir Francis L'Estrange Joseph, K.B.E., D.L., Mr. Albert Evans Pullar, Sir Josiah Charles Stamp, G.C.B., G.B.E., and the Rt. Hon. Lord Wigram, P.C., G.C.B., G.C.V.O., C.S.I., were unanimously re-elected directors of the company.

On the motion of Mr. W. J. Stevens, seconded by Mr. E. C. McAdam, Mr. Frederic Ditchfield Morris was re-elected an auditor of the accounts of the company.

Mr. Leslie Boyce proposed, and Councillor Wilson seconded, a vote of thanks to the Chairman and Directors and Management, which was carried with acclamation.

The Chairman briefly responded, and the proceedings were brought to a close.

#### SPECIAL GENERAL (WHARNCLIFFE) MEETING

A special general meeting of the London Midland & Scottish Railway Company was held at Euston Station on Tuesday, March 2, Sir Josiah C. Stamp, G.C.B., G.B.E. (Chairman of the company), presiding. The Assistant Secretary (Mr. G. R. Smith), read the notice convening the meeting.

The Chairman: This meeting has been convened in accordance with the Standing Orders of Parliament to submit for your approval two Bills which are being promoted in the present Session of Parliament, and a Provisional Order deposited with the Scottish Office. The first is the London Midland & Scottish Railway Bill promoted by the company. Its objects are first to authorise the company to construct works at Morecambe and to acquire lands in various parts of the system which are required for the improvement of the undertaking, and, secondly, to enlarge their present powers to charge rates and dues at Holyhead Harbour. The London Midland & Scottish Railway Provisional Order is promoted for the purpose of obtaining extension of the time limited for the completion of authorised works in Scotland.

The other Bill, the Great Western Railway Bill, requires your approval because it contains clauses authorising this company and the Great Western Railway Company to acquire land at Hereford in connection with the Shrewsbury & Hereford Railway jointly owned by the two companies. There are no capital powers in these Bills.

The two Bills and the Provisional Order were approved.

#### SPECIAL GENERAL MEETING

##### (Abandonment of Portions of Canals for Navigation Purposes)

The Assistant Secretary read the notice convening the meeting.

The Chairman: The business before this meeting relates

to certain canal properties of the company. The authority of the proprietors is required by statute to enable an application to be made to the Minister of Transport for his sanction to the abandonment of portions of three of the company's canals which are unnecessary. The following canals are concerned: First, the Manchester, Bolton and Bury Canal. This was authorised in 1791 and commences at Salford by a junction with the River Irwell Navigation, and extends to Bury and has an arm to Bolton. The total length is between 15 and 16 miles. During last year two serious breaches occurred in the canal embankment. The cost of repairing these breaches for the purpose of restoring the canal for through navigation purposes is estimated at just under £100,000. Having regard to the unsatisfactory financial position of this canal and the improbability of any material improvement in the amount of traffic in future, it is felt that this heavy expenditure necessary to restore and reopen the canal for navigation is unwarranted. With a view of obviating the possibility of further breaches and the heavy expenditure attendant upon such, it is recommended that the following portions of the canal should be abandoned—covering a total distance of 10½ miles: From a point near Clifton aqueduct to Bailey Bridge and, if found desirable, from Bailey Bridge to Bury. The whole of the branch canal from Prestolee Locks to Bolton.

Then the second proposition, the Shropshire Union Canal (Welsh Section). The Shropshire Union main canal extends from Ellesmere Port on the Manchester Ship Canal to Wolverhampton. With its branches the total length exceeds 194 miles. The undertaking was authorised between the years 1772 and 1827. During last year a breach occurred in the bank of the Welsh section of the canal near Frankton, Salop, which left the canal without water for a distance of more than a mile, thus severing the remainder of the Welsh section down to Newtown in Montgomeryshire—a distance of over 36 miles—from the rest of the canal. In view of the diminishing traffic on this section of the canal and the appreciable amount to be expended on the necessary work of repair, it is considered advisable that an application should be made for the relief of the company from their statutory liability to maintain for public navigation purposes and to obtain authority to abandon the Welsh section of the canal from its terminus at Newtown in the county of Montgomeryshire to Frankton in the county of Salop, a distance of 36½ miles.

The third proposal is the Cromford Canal. This canal was authorised in 1789 and in 1870 became vested in the Midland Railway Company. It starts at Cromford, Derbyshire, and runs to Langley Mill, Nottinghamshire. Its total length is just under 17 miles. Owing to the collapse of a tunnel at Butterley, 8½ miles from Cromford, in 1900, the canal became severed and the sections to the east and west of the tunnel have been maintained up to the present time for public navigation. As there has been a substantial decrease in traffic on the Western section since 1906, it would be of advantage if relief could be obtained from the obligation to maintain the Western section as a navigable canal from its westerly terminus at Cromford to the westerly end of the Butterley tunnel—a distance of 8½ miles. From the explanation I have given to you in regard to the portions of the three canals to which I have referred, I have endeavoured to show that it will undoubtedly be to the advantage of the canal undertaking as a whole if the company are empowered to abandon the specified lengths of these three canals, which total in all 55½ miles.

The resolution to authorise the application was put to the meeting and carried.

Mr. W. J. Stevens, in moving a vote of thanks to the Chairman, directors, officers, and staff, said that on reading at home a report of the speech delivered by the Chairman at the general meeting last Friday, he came to the conclusion, as most people must do, that this company had reached the highest point up to date of technical and scientific progress in railway operation.

The vote of thanks was unanimously agreed to, and the Chairman suitably replied.

The proceedings then terminated.



## Belfast & County Down Railway Company

The annual general meeting of the Belfast & County Down Railway Company was held at Queen's Quay, Belfast, on February 25, Mr. Thomas Balfour, Chairman of the company, presiding.

The Chairman said that before proceeding with the ordinary business of the meeting it was his sorrowful duty to refer to the great loss sustained by the company through the passing of their late Chairman, Mr. Thomas Richardson, D.L., which occurred with tragic suddenness on December 13 last. Mr. Richardson had been a director for 41 years, for 20 years of which he was Chairman. The company had experienced a further sad bereavement by the recent death of Sir Samuel Kelly, C.B.E., D.L., who had been a member of the board for the past 16 years. To fill the vacancy in their numbers, the directors had been fortunate in securing the services of Mr. Joseph McConnell.

In March last year Mr. Harry Edward Mellor retired from the position of Secretary, which he had held efficiently for a quarter of a century, and the board appointed Mr. Thomas Balmer Andison to that office.

### Better Times Ahead

The Chairman prefaced his review of the report and accounts with the comment that he could not help feeling that better times lay ahead in view of the further anticipated revival in industry, and the consequent increased circulation of money, combined with the co-ordination of transport under the Northern Ireland Road and Rail Transport Act. Revenue receipts from railway working were £1,933 higher than in 1935. A saving of £517 had been effected in railway and hotel expenditure. Total expenses were lower by £13,929, of which £13,412 was accounted for by savings in respect of road services no longer operated.

Net income worked out at £15,466, which was £326 below last year's figure, but after bringing forward the balance of £1,876 18s. 3d. from last year's accounts, and deducting interest and other charges, there remained £1,767 7s. 7d., which sum it was proposed to carry forward to the current year's accounts. He regretted that the holders of 5 per cent. and 4 per cent. preference stocks would again be called upon to forego a dividend.

It was disappointing that gross receipts from railway working showed an improvement of no more than £2,015, but passenger receipts had been affected by the bad weather throughout the summer. First class passengers decreased by 1,193, involving a drop in receipts of £103; in the second class, receipts fell off by £374. The Chairman ascribed these figures to the growing use of private cars in preference to the railway. Third class traffic, however, improved by 42,618 in numbers and £1,194 in receipts. Excluding season ticket holders, 3,000,000 passengers had been carried during the year, contributing £822 more than in 1935.

There was an increase of £1,073 in goods receipts, traffic having improved by 989 tons. Cattle foods, petroleum (paraffin and motor spirit), and sand traffic showed the largest improvements. More pigs had been carried, under the arrangement with the Pigs Marketing Board whereby this traffic was conveyed over the Northern Ireland railways to the ports and curing stations at a flat rate, receipts being pooled and divided among the railway companies on a terminal and mileage basis. Although there had been a reduction in horses, calves, and sheep, the better pig traffic had been the principal contributor to a gratifying improvement in livestock results.

### Strict Economy Enforced

Expenditure on railway working was reduced by £206, the strictest economy having been enforced. This result was achieved despite the fact that £1,000 more had been spent on coal following a rise in price, and re-upholstering of coaches had been continued on a larger scale. Also, 10 new goods wagons were built to replace old stock.

The Hotels and Refreshment Rooms Department showed a

net profit to September 30 of £4,093 19s. 4d., or £789 less than the previous year. A new item in the balance sheet was £18,792 on the credit side, representing the company's holding of Northern Ireland Transport stock received in exchange for road services now operated by the transport board. A sum of £520 had been credited to capital account from the sale of land, and this had been invested in 3½ per cent. War stock to conform to the company's obligations to its shareholders. It was expected that there would be a considerable economy in working expenses when diesel-electric traction was introduced on the Ardglass branch.

The report and accounts were adopted.

## Londonderry & Lough Swilly Railway Company

The annual general meeting of the Londonderry & Lough Swilly Railway Company was held on February 26, Mr. I. J. T. Colquhoun, Chairman of the company, presiding.

The Chairman, in moving the adoption of the report and accounts, said that the loss on the year's working was the smallest since the war. The company was doing its best to encourage tourist and excursion business in Donegal in every possible way. The board felt more confidence in the future, the prospects for 1937 presenting a more hopeful outlook. Prices for agricultural produce had shown a considerable improvement in recent times. The Burtonport line was becoming old, and was increasingly difficult and costly to maintain, and he was afraid the time was approaching when the question of curtailment or withdrawal of services—or, alternatively, a very heavy expenditure on renewals on this section—would have to be faced.

Mr. H. P. Swan, P.C., said the tendency was in the right direction. He hoped the Burtonport line would always be open to goods traffic. The closing of this section would be a calamity.

The report and accounts were adopted.

## Sligo, Leitrim & Northern Counties Railway Company

The annual general meeting of the Sligo, Leitrim & Northern Counties Railway Company was held at Sligo on February 26, Captain George Hewson, D.L., Chairman of the company, presiding.

The Chairman, in moving the adoption of the report and accounts, said that gross receipts for the year were £27,078, but expenditure of £31,260 resulted in a loss on railway working of £4,181. Miscellaneous net receipts of £537, and the Government of Ireland grant-in-aid of £2,500, left a net debit balance on working of £1,143, but adding the debit balance of £17,476 from the last accounts brought the total net debit to £18,620. Payment of interest and other charges increased it to £21,570, again to be carried forward. The higher expenses were accounted for by extensive repairs to rolling stock, and 2¼ miles of the system were relaid, leaving approximately one mile of line to be completed.

The gross receipts showed a rise of £200, but it was to be remembered that the increase in 1935 had been £4,000. The increase under maintenance and renewals of rolling stock was £2,000; although by the end of the year it was hoped to be back to normal as regards permanent way renewals, they could not expect a reduction in rolling stock outlay for another two years.

Passenger train receipts for the period under review were £300 higher, and the directors believed that the increase of 10,000 passengers was largely due to the improved service given by railbus. Mails and parcels traffic were about the same, but there had been an improvement in livestock. At present the company was holding its own, and a return to better conditions was in prospect, provided that the course of recovery was not disturbed by the unsettled state of world politics.

The report and accounts were adopted.



## SIR JOSIAH STAMP AND THE BRITISH ROAD FEDERATION

Text of the remarks of the British Road Federation on Sir Josiah Stamp's speech at the annual general meeting of the L.M.S.R.; Sir Josiah's point-by-point reply is inserted in italics

On Tuesday, the British Road Federation Limited, of 120, Pall Mall, London, which comprises 48 national road transport organisations, issued a statement in reply to the remarks of Sir Josiah Stamp on the subject of rail and road competition. Sir Josiah replied point by point the same day, and, to facilitate comparison, we have numbered the paragraphs and set out both statements below. The paragraphs in roman type are the statements of the British Road Federation, and the replies in italics are those of Sir Josiah Stamp.

(1).—The British Road Federation has been considering the speech made by Sir Josiah Stamp at the annual meeting of the London Midland & Scottish Railway Company, in which he makes the charge against road transport, namely, that of "uneconomic competition."

(2).—Notwithstanding his complaint against the continued increase in road transport competition, the freight traffic receipts of the L.M.S.R. increased last year by 5.4 per cent. In fact, so favourably did the increase compare with the Board of Trade Index of Production, that the graph of railway receipts which in the past has been given in his speech, for the first time omits the comparison, now favourable, of any receipts with the Index of Industrial Production.

(2).—No graph comparing L.M.S. receipts with the Index of Production has ever been published. Up to two years ago two graphs were published: one compared L.M.S. tonnages with the Index of Production (not Board of Trade as stated by the B.R.F.) and tare of goods motor vehicles. The other graph compared L.M.S. receipts with those of the American and German railways. Last year the receipts graph was dropped and this year the tonnage graph was dropped, the reason in each case being that of best serving general interest. For instance, the fact that the L.M.S. gross and net receipts had made an equal recovery was considered to be of such general interest that it was considered preferable to concentrate on this one graph. The B.R.F. statement that the graph withheld this year was due to the fact that it would have been too "favourable" is entirely inaccurate. Had the graph been published it would have shown:

	Standardised on 1929 as 100		Upward movements in year
	1935	1936	
<i>L.M.S.R. Tonnages</i>			
March quarter .. ..	85.5	89.5	4.0
June .. ..	82.3	87.5	5.2
Sept. .. ..	80.1	86.0	5.9
Dec. .. ..	89.6	90.8	1.2
<i>Index of Production</i>			
March quarter .. ..	95.9	107.5	11.6
June .. ..	97.7	106.8	9.1
Sept. .. ..	96.6	105.9	9.3
Dec. .. ..	101.6	107.1	5.5
<i>Tare of goods motor vehicles</i>			
Year .. ..	128.8	136.2	7.4

The above figures do not at all support the B.R.F. allegation.

(3).—It has never yet been shown that the traffic which is now going by road and has previously been carried at higher rates by rail has, in fact, been the "cream" of railway traffic.

(3).—The speech\* contained no reference to the "cream" of railway traffic. It was merely stated that "the broad features of the uneconomic competition remain, some of them even aggravated—the ability of road hauliers to pick and choose traffic and to charge rates and charge without any responsibility for transport as a whole is unaltered. It continues to wear down the upper ranges of the railway rates classification on which the industry of the country has been built up, for which it has declared its preference, but which it does little, sectionally, to preserve."

\* Reported on page 444 this week.

(4).—The railway companies are still making or attempting to make payments to capital representing assets, which have by now depreciated to vanishing point. They are still paying interest for capital originally subscribed for rolling stock now extinct, which in other businesses would have been written off. Road transport is not encumbered with this accretion of 100 years, and for this reason, amongst others, is able to charge more attractive rates. It is not in the national interest that railway stockholders should attempt to hold back the economic development of a rival transport for ever.

(4).—As stated in the speech, assets that disappear from use are written out of the capital account currently. Further, the cost of replacing the existing assets at current prices would be far in excess of the amount shown in the railway capital account. It is incorrect to say that the L.M.S. capital account contains any extinct rolling stock. The account is closely supervised and the L.M.S. Company has credited the capital account with the following amounts in respect of rolling stock:—

1931 .. ..	176,285
1932 .. ..	1,595,246
1933 .. ..	434,996
1934 .. ..	857,834

(5).—The rate classification which the railways are so determined to maintain, and on which their case is based, is continually being broken down by the railways themselves. The Licensing Authority for the Yorkshire Traffic Area recently stated that apparently only 20 per cent. of goods are carried by the railways at standard rates.

(5).—Uneconomic road competition continues to wear down the upper ranges of the classification. We have also said elsewhere that the railway charging structure is disintegrating from this cause. Remove the cause and the classification will stand as it has stood for over 100 years. All this was made clear in the speech.

(6).—Sir Josiah, stressing the fact that railway rates are published, omitted to mention that the railways have the right, which they exploit to the full, of enquiring into road hauliers' rates and the names of their customers at the licensing courts. The road hauliers have no similar rights before the Railway Rates Tribunal.

(6).—In the Bouts-Tillotson case\* the Licensing Authority said that he had no jurisdiction in regard to rates of charge for road transport. On this the Appeals Tribunal said: "Mr. Gleeson Robinson says that he has no jurisdiction in regard to rates of charge for road transport. We agree. We think it is clear from the Act that the legislature did not intend that the Licensing Authority should, when exercising his discretion, have regard to the fact that in many instances goods can be and are carried at rates at which the railway companies can carry those same goods. If the suggestion of the railway companies is well founded, and we express no opinion thereon, they must seek their remedy elsewhere." Rates are thus ruled out in cases before the licensing authorities. But the B.R.F. statement ignores that:—

(a).—All railway rates have to be published and are available to road hauliers. There is no similar obligation on road hauliers.  
(b).—The Rates Tribunal proceedings have to be published, containing all details of railway applications. Road hauliers can obtain copies of this evidence for their own purposes; whereas the licensing authorities have no jurisdiction over rates in cases brought before them.

(7).—On the question of the position of road transport in an emergency, Sir Josiah challenged the views of Sir William

\* See THE RAILWAY GAZETTE of February 19, pp. 305 and 338.

Beveridge, when the latter advocated the expansion of heavy road vehicles in order to provide alternative transport wherever the railways, which are so vulnerable to air attack, have been put out of operation. In Continental countries, where the co-ordination of transport which Sir Josiah earnestly desires has almost reached achievement, the governments concerned have given every possible encouragement to heavy road transport in view of its indispensability in moving men and equipment about rapidly.

(7).—The B.R.F. statement refers to co-ordination in Continental countries. The primary object on the Continent has been to maintain the railway and the railway charging structure as a national necessity. See for example, Sir Osborne Mance's address\* to the Institute of Transport, on February 17, 1937.

(8).—The railways have failed in their recent appeal to the Transport Appeal Tribunal to obtain a monopoly of long-distance traffic, and they would do well to accept the fact that road transport provides services of speed, convenience and cheapness, which traders are anxious to have. If the railway policy is the abolition of all road transport which competes with their own services, then negotiations with a view to the co-ordination of transport would appear to be a waste of time.

\* Reported in THE RAILWAY GAZETTE of February 19, page 330.

(8).—The railway policy, as expressed in the speech, is "to secure the highly necessary co-ordination of road and rail function in the public interest, by co-operation in regard to rates and whatever other means suggest themselves. We have every desire that road transport should take the place for which it is economically suited, and stand by the principle which I have so often stated, that when the conditions and regulations governing the respective forms have been as far as possible equalised, we are ready to let the division of traffic settle itself upon purely economic lines, subjecting, however, the particular interest of sections of the community to any overriding considerations which may be necessary in the interests of the country as a whole."

(9).—Every two years a road haulier has to prove his right to trade at all before a court, in a case that is often long, arduous, and expensive. The Road and Rail Traffic Act has in fact operated practically to prevent the expansion of the road haulage industry. Not only is it extremely difficult in practice to give the precise proof of the public need for more vehicles which a licensing authority requires, but no reserve of vehicles not fully used is allowed. The result is that an operator cannot fulfil an order to a new customer over and above his regular work, and so cannot meet normal expansion of trade.

(9).—No railway comment is necessary.

## Mr. Whitelaw on Railway Expenditure

Delivering his presidential address to the Railway Students' Association of the London School of Economics on February 24, Mr. William Whitelaw, Chairman, L.N.E.R., took as his subject "Railway Expenditure." Lt.-Col. G. S. Szlumper, Assistant General Manager, Southern Railway, presided, and among those present were: Brig.-Gen. Sir H. Osborne Mance; Messrs. W. V. Wood, H. H. Mauldin, O. H. Corble, C. E. R. Sherrington, W. Tetley Stephenson, G. Morton, J. E. Sharpe, H. F. Pallant, J. C. L. Train, A. E. Tattersall, F. C. C. Stanley, J. J. Rogers, L. W. Orchard, H. Bailey, and A. F. Wallis.

Mr. Whitelaw first examined the financial position in which the four main-line railway companies started on their careers in 1923. They had lain upon them by the Act of 1921 a financial problem of obvious difficulty—obvious at least to everyone except the authors of the Act and Members of Parliament, to whom apparently the problem was the essence of simplicity. In the first place, the railways were informed that they were entitled to earn interest and dividend upon capital at such rates as would secure the annual divisible profits of the year 1913. According to Parliament these were to be secured by the simplest possible method. The railways were ordered to pay such rates of wages and observe such conditions of labour as a tribunal should order from time to time. Another tribunal was provided to inspect the annual accounts, and if it considered that administration and management were efficient and economical, would arrange for such rates and fares to be charged as would yield the profits mentioned. Unfortunately, finance was not quite so easy as Parliament chose to pretend, and there were such things in this im-

perfect world as rates which traders would not pay and fares which passengers would not tolerate.

It was thus obvious that new expenditure was the most important question which faced railway administrations. One type of expenditure which was always under suspicion was that proposed with a view to solving some difficult problem of railway working. For instance, it was always much easier to ask for the doubling of a single track than to sit down and devise an entirely new timetable to meet the congestion of traffic in a bottleneck. A much more welcome type of expenditure was that which would so substantially reduce annual expenditure as to yield a handsome contribution to the dividend fund. In this case a railway officer asking for the expenditure knew that his forecast of ultimate profit was going to be subject to comparison with the actual result, so that for his own credit he would avoid making rash assertions in his estimates.

Between January 1, 1923, and December 31, 1936, the L.N.E.R. board approved over 2,000 schemes, involving a total expenditure of about £6,350,550, which were submitted with the object of reducing annual expenditure by the use of the most up-to-date and scientific methods of working. The actual savings thereby effected had been certified by the Accountant to have amounted to just over 29 per cent. per annum on the cost. Yet another form of expenditure was that which might be undertaken in order to make profit out of new business. On the other hand, some business was found to be better lost altogether than retained at undue cost, and the problem for the traffic officer was to decide what was worth keeping at a cost, and how great would be the cost of retaining it.

Another kind of expenditure was one which had come down from the past. The best instance of this was the local and branch line passenger train services inherited from the days before the petrol engine. During last year the net savings secured by the L.N.E.R. from the closing of branch lines for passenger traffic, reduction of train services rendered possible by the employment of omnibus services, and other measures of co-ordination amounted to approximately £99,000.

In considering schemes involving new expenditure, statistics must have a prominent place and there was no more dangerous moment in the course of railway administration than that at which statistics forced themselves into prominence. To read statistics was not difficult, but it was not always so easy to put the right interpretation upon them. The most useful statistics for controlling the operation of freight traffic was the net ton-mile per total engine-hour, but it might lead one into most woeful misunderstanding unless it was appreciated how it was made up and what were the limits of its teaching. This unit must not, for instance, be used to compare the working of one company with that of another, or even the working of one district of a company with that of another of its own districts, as the figure depended so much upon the type of traffic carried.

UNIVERSITY COLLEGE, LONDON, ENGINEERING SOCIETY.—This society, which was founded in 1884, has in preparation the first issue of a year book, which will be sent free to former students. Old members are asked to send their names, addresses, years at college, academic and professional qualifications, present appointment, and news of their contemporaries to Mr. P. H. Walker, Engineering Department, University College, Gower Street, W.C.1.

## NOTES AND NEWS

**Railway Convalescent Homes.**—The spring banquet of these homes will be held in the Wharncliffe Rooms of the Hotel Great Central on Friday evening, March 12 next, when the President, Sir Josiah Stamp, G.C.B., G.B.E., will take the chair.

**L.P.T.B. New Tube Tunnel Contract.**—The first contract for the tunnelling required for the new North-East London tube extensions has been placed with Charles Brand & Son Limited. The value of this contract exceeds £650,000 and covers the boring of the tunnels between Liverpool Street and Mile End.

**Rhodesia Railways Debenture Stock.**—The total applications by way of conversion and cash for the issue of £21,570,000 Rhodesia Railways 4½ per cent. debenture stock offered to the public at 98 per cent., of which mention was made last week, amounted to about £10,850,000. The balance was taken by the underwriters.

**Canadian Pacific Earnings.**—Gross earnings of the Canadian Pacific Railway for the month of January, 1937, amounted to \$10,194,000, an increase of \$870,000 in comparison with January, 1936. In the working expenses of \$9,280,000 there was an increase of \$569,000, leaving net earnings \$301,000 higher, at \$9,114,000.

**Canadian National Earnings.**—Gross earnings of the Canadian National Railways for the year 1936 were \$186,610,489, an increase of \$13,520,025 on 1935. Operating expenses (\$171,477,690) advanced by \$12,551,441 and net earnings were \$968,584 higher, at \$15,132,799. For the month of January, 1937, the gross earnings amounted to \$14,043,352, an increase of \$1,300,798 in comparison with January, 1936. Working expenses, at \$13,960,130, were \$641,245 higher, and there were net earnings of \$83,222, against a deficit of \$576,331 for January, 1936.

**New L.M.S.R. Freight Yard near Barking.**—The L.M.S.R. is to lay down a new marshalling yard at Ripple Lane, between Barking and Dagenham Dock, L.T. & S. Section. The scheme, which will cost £50,000, will improve service to traders in the rapidly developing industrial area served by the Barking-Pitsea (via Tilbury) line, and will relieve Little Ilford of traffic which is now outstripping its capacity. At the outset a down yard of eight sidings, for 522 wagons, will be provided; and an up yard, of six sidings, for 406 wagons, together with reception lines, shunting necks, and accommodation for cripple wagons. As far as possible, there will be through workings between Brent sidings (Midland Division) and the new yard. Traffic from the Western Division and the L.N.E.R. arriving at Plaistow will be forwarded to the yard for sorting and despatch to Tilbury Section destinations. Up traffic will be sorted in the up yard and sent to

Little Ilford, Plaistow, and Brent for attachment to trains starting from those points.

**Higher Rates and Fares in Belgium.**—An Exchange Telegraph message from Brussels reports the Belgian Cabinet's approval of the raising of passenger fares on the National Railways by 50 per cent., and merchandise rates by about 10 per cent.; also the raising of preferential tariffs.

**Suggested Purchase by Uruguayan Government of the Midland Uruguay Railway.**—A Reuters message from Monte Video states that the Uruguayan Government had decided to lay before Parliament a proposal to purchase the British-owned Midland Railway of Uruguay. The London office of the Midland Railway has no further information on this point and we understand that at present it is merely a suggestion of the Uruguayan Government.

**Liverpool Overhead Results.**—At the recent annual meeting of the Liverpool Overhead Railway Company, the Chairman (Alderman M. H. Maxwell), said that on the year's working there was a surplus of £375, as compared with a deficiency of £685 in 1935. Increases had taken place in all categories of passenger traffic, with the exception of season tickets. The number of passengers carried was 6,380,000, compared with 6,188,000 in 1935. A distinct improvement in traffic had set in during October, since which time the increased traffic had averaged £75 per week.

**Loud Speakers for York, L.N.E.R.**—As a result of experiments with loud speaker equipment, the London & North Eastern Railway has decided to introduce this method of broadcasting information to the public at York station during exceptionally busy periods, such as Saturdays in the summer months and at holiday times. It is expected that the new equipment will be ready for use at Easter. It is believed that the installation of a dozen loud speakers at suitable points to cover the 14 platforms (the main platform is 1,500 ft. long) will prove of great assistance to passengers.

**Rail Links in Empire Airways.**—With the gradual introduction of the Empire flying boats on the Empire services, Imperial Airways is now making use of Southampton for all departures on the India and Australia services and for all arrivals on the Africa services. Passengers travelling by these services leave London for Southampton Docks by a special Pullman car attached to an ordinary train from Waterloo station. At Southampton Docks passengers are taken aboard the flying-boats by special high-speed motor-boats. At present passengers arriving from India and Australia alight at Marseilles, then travel overnight from Marseilles to Paris by rail, then fly

from Paris to London next morning. Those leaving for Africa depart from Croydon, fly to Paris, travel by rail to Marseilles, and pick up the flying boat at Marseilles. During the present month, however, Imperial Airways expects that all Empire passengers will leave and arrive at Southampton and fly to Alexandria via Marseilles, Bracciano, Brindisi, Athens, and Alexandria.

**Mishap at Langley, G.W.R.**—On March 1, the 7.45 p.m. empties train from Reading (Oxford Road) to Old Oak Common, which had been put into the up goods loop at Dolphin Junction, Langley, over-ran its signals, and became derailed at the catchpoints. The engine went down the bank, and some of the derailed wagons fouled the up relief line just as the 6.35 p.m. ex-Oxford passenger train was approaching. It collided with the obstruction, with the result that the engine and the three leading coaches were derailed. A guard on the passenger train was killed, and several other persons injured.

**Proposed Tube Railway under Tyne.**—Although the Ministry of Transport is not prepared to make a grant towards the tube railway under the Tyne between North and South Shields which has been under discussion for some years, the town councils concerned have been informed that a firm of London contractors, Arthur Whitley Limited, is prepared to go ahead with a £400,000 scheme for such a line. The proposal is for an electric railway on the Kearney high-speed principle, to be built about 40 ft. below the surface of the river. This scheme, however, is criticised by the South Shields Council, which, with Tynemouth, has been approached for support, on the grounds that it provides only for passenger transport. It is understood that neither the South Shields nor Tynemouth Corporations will be asked to undertake any financial responsibility.

**Private Bills in Parliament.**—The Great Western Railway Bill being now unopposed in the House of Commons, has been removed from Group B of opposed Bills and referred to the Committee on Unopposed Bills. Amongst the two petitions withdrawn has been that of the Dawlish Urban District Council with reference to a deviation and a small extension of the new avoiding line at Dawlish. After a debate on the subject of the third rail, the second reading of the Southern Railway Bill was carried in the House of Commons on Wednesday, March 3. It was stated by Captain Austin Hudson, Parliamentary Secretary to the Ministry of Transport that the total number of fatalities due to contact with the live rails on the Southern Railway during the five years 1932-36 was 21, of which 19 were cases of trespass. The motion for the second reading of the North Staffordshire Road Transport Bill was rejected in the House of Commons on March 3 by 163 votes to 108. The petition of Sheffield Corporation against the London Midland & Scottish Railway Bill has been withdrawn.



## British and Irish Traffic Returns

GREAT BRITAIN	Totals for 8th Week			Totals to Date		
	1937	1936	Inc. or Dec.	1937	1936	Inc. or Dec.
L.M.S.R. (6,877½ mls.)	£	£	£	£	£	£
Passenger-train traffic...	402,000	387,000	+ 15,000	2,997,000	2,932,000	+ 65,000
Merchandise, &c. ...	497,000	470,000	+ 27,000	3,802,000	3,662,000	+ 140,000
Coal and coke ...	297,000	278,000	+ 19,000	2,319,000	2,338,000	- 19,000
Goods-train traffic ...	794,000	748,000	+ 46,000	6,121,000	6,000,000	+ 121,000
Total receipts ...	1,196,000	1,135,000	+ 61,000	9,118,000	8,932,000	+ 186,000
L.N.E.R. (6,332 mls.)						
Passenger-train traffic...	265,000	257,000	+ 8,000	2,006,000	1,968,000	+ 38,000
Merchandise, &c. ...	365,000	324,000	+ 41,000	2,593,000	2,537,000	+ 56,000
Coal and coke ...	278,000	259,000	+ 19,000	2,117,000	2,167,000	- 50,000
Goods-train traffic ...	643,000	583,000	+ 60,000	4,710,000	4,704,000	+ 6,000
Total receipts ...	908,000	840,000	+ 68,000	6,716,000	6,672,000	+ 44,000
G.W.R. (3,738½ mls.)						
Passenger-train traffic...	162,000	154,000	+ 8,000	1,250,000	1,231,000	+ 19,000
Merchandise, &c. ...	201,000	193,000	+ 8,000	1,515,000	1,465,000	+ 50,000
Coal and coke ...	118,000	112,000	+ 6,000	941,000	934,000	+ 7,000
Goods-train traffic ...	319,000	305,000	+ 14,000	2,456,000	2,399,000	+ 57,000
Total receipts ...	481,000	459,000	+ 22,000	3,706,000	3,630,000	+ 76,000
S.R. (2,153 mls.)						
Passenger-train traffic...	253,000	244,000	+ 9,000	1,991,000	1,910,000	+ 81,000
Merchandise, &c. ...	64,000	68,000	- 4,000	450,000	470,500	- 20,500
Coal and coke ...	42,000	44,000	- 2,000	285,000	322,500	- 37,500
Goods-train traffic ...	106,000	112,000	- 6,000	735,000	793,000	- 58,000
Total receipts ...	359,000	356,000	+ 3,000	2,726,000	2,703,000	+ 23,000
Liverpool Overhead (6½ mls.)	1,162	1,064	+ 98	9,499	9,115	+ 384
Mersey (4½ mls.)	4,108	4,001	+ 107	33,843	32,804	+ 1,039
*London Passenger Transport Board	564,200	538,700	+ 25,500	19,566,300	18,989,700	+ 576,600
IRELAND						
†Belfast & C.D. pass. (80 mls.)	1,529	1,650	- 121	13,410	14,735	- 1,325
" " goods	643	585	+ 58	3,948	4,471	- 523
" " total	2,172	2,235	- 63	17,358	19,206	- 1,848
Great Northern (543 mls.) pass.	7,550	7,750	- 200	59,300	61,650	- 2,350
" " goods	9,500	10,400	- 900	71,800	78,900	- 7,100
" " total	17,050	18,150	- 1,100	131,100	140,550	- 9,450
Great Southern (2,075 mls.) pass.	25,726	26,348	- 622	205,827	211,131	- 5,304
" " goods	41,037	40,233	+ 804	331,526	327,485	+ 4,041
" " total	66,763	65,581	+ 182	537,353	538,616	- 1,263

\* 35th week.

† 9th week.

## Railway and Other Reports

**Bengal Doonars Railway.**—The interim report shows that the approximate net earnings for the six months ended September 30, 1936, after allowing for Indian taxation, amounted to £18,796, which, together with £55,110 brought forward from March 31, 1936, £913 for interest, and £55 for profit on exchange, makes a total of £74,874. From this amount must be deducted £7,200 for six months' dividend on the preference stock, leaving an available balance of £67,674. The board has declared an interim dividend of 2½ per cent. on the ordinary stock on account of the year ending March 31, 1937, subject to United Kingdom income tax (less relief in respect of Dominion income tax), which will absorb £10,000, leaving £57,674 to be carried forward at September 30, 1936. Dividend warrants will be posted to the ordinary stockholders on March 23, 1937.

**Isle of Man Railway.**—Receipts from all sources during the year 1936

amounted to £49,167, a decrease of £923 in comparison with 1935. Traffic receipts (£47,944) were £1,107 lower. Working expenses were reduced from £37,838 to £37,034, and rates, taxes, and other charges from £1,507 to £1,502. Receipts from passengers were £32,247 (against £33,290), from parcels, etc., and mails £5,818 (against £5,764), and from merchandise, minerals, etc., £9,879 (against £9,997). The number of passengers fell from 790,435 to 761,418, but the quantity of merchandise and minerals conveyed rose from 43,172 tons to 44,869 tons. The directors recommend a dividend of 2 per cent. for the year on the ordinary share capital, and out of the balance of £2,548 propose to set aside £1,200 towards relaying the main line, leaving £1,348 to be carried forward.

**Charles Roberts & Co. Ltd.**—The company announces that interest at the rate of 4 per cent. per annum, less tax, will be paid on March 31 next on the 4 per cent. first debenture stock for the half-year ending on that date.

## British and Irish Railways Stocks and Shares

Stocks	Highest 1936	Lowest 1936	Prices	
			Mar. 3, 1937	Rise/ Fall
G.W.R.				
Cons. Ord. ....	64½	45½	58½	+½
5% Con. Prefce. ....	126½	116¾	113	+½
5% Red. Pref. (1950) ..	113	108½	109½	—
4% Deb. ....	119½	110½	105	+½
4½% Deb. ....	121	114	108	—½
4½% Deb. ....	129	121	114½	—
5% Deb. ....	141	134	127½	+½
2½% Deb. ....	79½	74	69½	—
5% Rt. Charge ....	136½	130	122½	+2
5% Cons. Guar. ....	135½	127¾	120½	+1
L.M.S.R.				
Ord. ....	35½	17	29	+½
4% Prefce. (1923) ....	83	52½	75	+2½
4% Prefce. ....	92¾	81	82½	+½
5% Red. Pref. (1955) ..	109½	103¼	103½	—
4% Deb. ....	111¾	105½	102½	+½
5% Red. Deb. (1952) ..	119½	115½	113½	—
4% Guar. ....	106¾	101½	99	+2½
L.N.E.R.				
5% Pref. Ord. ....	14	9	10	—
Def. Ord. ....	7¼	4¾	5	—¼
4% First Prefce. ....	79¼	55¼	70*	—2½
4% Second Prefce. ....	317½	18¼	22½*	—½
5% Red. Pref. (1955) ..	100½	77¾	95½*	—4
4% First Guar. ....	104½	98¾	94½	+½
4% Second Guar. ....	99	90	88½	+½
3% Deb. ....	85¾	79	76½	+½
4% Deb. ....	109¾	104½	102	+2½
5% Red. Deb. (1947) ..	116¼	110½	109½	—
4½% Sinking Fund Red. Deb. ....	111½	107½	106½	—
SOUTHERN				
Pref. Ord. ....	98¾	82½	89½	—1
Def. Ord. ....	27¾	20½	23	+½
5% Pref. ....	120¾	118½	111½	+2
5% Red. Pref. (1964) ..	119¾	115¼	111½	—
5% Guar. Prefce. ....	136	129½	120½*	+½
5% Red. Guar. Pref. (1957) ..	120	115¼	112½*	—
4% Deb. ....	117½	109½	104½	+2
5% Deb. ....	140	134	125½	—
4% Red. Deb. ....	116½	110	108	—
1962-67				
BELFAST & C.D.				
Ord. ....	9	4½	5	—
FORTH BRIDGE				
4% Deb. ....	107	105	102½	—
4% Guar. ....	107½	104	100½	—
G. NORTHERN (IRELAND)				
Ord. ....	19½	9¾	10	—
G. SOUTHERN (IRELAND)				
Ord. ....	63	41	48	+1
Prefce. ....	65	46	58½	—½
Guar. ....	97¼	81	81	—1
Deb. ....	99¾	83¼	93½	—
L.P.T.B.				
4½% "A" ....	127¾	121	114½	+1
5% "A" ....	138¼	133½	124½	+2
4½% "T.F.A." ....	111½	108½	105	—
5% "B" ....	131¾	123¾	119½	+1
"C" ....	112½	93	92	—
MERSEY				
Ord. ....	40¾	23	35½	—
4% Perp. Deb. ....	103	98	99	—
3% Perp. Deb. ....	78	74½	75½	—
3% Perp. Prefce. ....	687½	63¼	64½	—1

\* ex dividend

## CONTRACTS AND TENDERS

Charles Brand & Son Limited has received the contract from the London Passenger Transport Board for boring the tunnels between Liverpool Street and Mile End. The work is part of the £14,500,000 scheme to improve railway facilities in North-East London and the amount of this, the first contract under the scheme, exceeds £650,000.

### New Uxbridge Station, L.P.T.B.

A. Waddington & Sons Ltd. has received a contract from the London Passenger Transport Board for the demolition of buildings on and off the High Street, Uxbridge, to clear ground for the new £250,000 Uxbridge station. Work will begin immediately. The buildings to be removed include the Ram's Hotel and premises behind shops fronting the High Street. Plans provide for a station with four platforms, fully roofed over. A bold frontage will be filled with shops arranged in the form of a crescent, and a short arcade will give access to the large booking hall and the platforms.

Kinnear, Moodie & Co. has received a contract from the London Passenger Transport Board for the construction of pilot tunnels for the lengthening of station tunnels on the Central London Line.

Howell & Co. Ltd. has received an order from the Central Argentine Railway for 22,000 Aquadinox steel boiler tubes.

Dobbie McInnes Limited has received an order from the Chinese Government Purchasing Commission to the inspection of Messrs. Fox & Mayo for three sets of locomotive cylinder indicators required for the Canton-Hankow Railway.

W. G. Bagnall & Co. Ltd. has received an order from the Bombay, Baroda & Central India Railway for two 2 ft. 6 in. gauge 0-6-2 locomotives and tenders to be supplied to the inspection of Messrs. Rendel, Palmer & Tritton.

An £84,000 contract for the supply of Westinghouse brakes to the Lithuanian Government has been accepted in principle by the Lithuanian Parliament, states a Reuters message from Kaunas (Kovno). The Lithuanian Parliament, it adds, has elected a Special Committee to prepare a Bill sanctioning the fulfilment of the contract, by the Westinghouse Brake & Signal Co. Ltd.

Steel, Peech & Tozer Limited has received an order from the Central Argentine Railway for 170 locomotive tyres.

The South Indian Railway Administration has placed orders to the inspection of Messrs. Robert White & Partners, with the Exors. of James Mills Limited, for 112,000 steel cotters and with Wm. Beardmore & Co. Ltd. for 14 pairs of broad-gauge, and 530 pairs of metre-gauge rolled-steel disc wheels and axles.

D. Wickham & Co. Ltd. has received an order from the Great Western of Brazil Railway for four petrol-driven No. 17A gang trolleys and four trailers.

### G.W.R. New Works

The following works are to be undertaken by the Great Western Railway: At Birkenhead extensive repairs are to be made to the roof of the engine shed; repairs and improvements are also to be carried out to the engine shed at Duffryn yard, Port Talbot; at Blaenau Festiniog the bridge over the water-course is to be reconstructed and also the bridge over the public road near Ford Halt, Keyham, Plymouth; at Stourport-on-Severn and at Monmouth, Troy, a new warehouse is to be provided for the convenience of local traders, and at Cirencester the Town goods station and office accommodation is to be reconstructed.

The Directors of the Great Western Railway Company have authorised the placing of the following contracts:—

R. A. Lister & Co. Ltd.: Supply of two "C.S." Lister platform auto-trucks.

Trojan Limited: Supply of two Trojan Special Senior road vans.

Express Motor & Body Works Limited: Supply of one Morris 30-cwt. normal control chassis, and two Morris 2-ton forward control chassis.

E. Turner & Son Limited: Alterations and additions to the goods offices at Swansea High Street station.

The Horsehay Co. Ltd.: Supply of one mechanically-operated tipping turntable at Newport Docks.

Becco Engineering & Chemical Co. Ltd.: Supply and erection of water-softening plant at Southall.

West's Rotinoff Piling & Construction Co. Ltd.: Provision of foundations and piling at Brent Viaduct, near Brentham Halt, Ealing, in connection with the construction of the new electrified lines to Ruislip.

E. A. Foulds Limited: Provision of an electrically-driven service lift at the Great Western Royal Hotel, Paddington.

For the Swindon Works

The British Oxygen Co. Ltd.: One universal frame cutting machine.

R. Pratt Limited: One Fordson tractor.

The South African Railways and Harbours Administration has placed orders with the Anderston Foundry Co. Ltd. for gauge clips (Order No. B8707/3, total price £1,575) and with R. Hostombe for ferro manganese (Order No. B 801, total price £3,412 10s.)

The Bengal & North-Western Railway invites tenders receivable by March 23, at 237, Gresham House, Old Broad Street, E.C.2, for the supply of 26,850 tungsten filament lamps.

The Bengal & North-Western and Rohilkund & Kumaon Railways invite tenders receivable at 237, Gresham House, Old Broad Street, E.C.2, by March 23, for the supply of 288 axles, 6,302 helical volute springs and 628 tyres for locomotives, carriages and wagons.

The Argentine State Railways Administration is calling for tenders, to be presented in Buenos Aires by April 7, for the supply of 67,689 m. of seamless steel tubing for boilers, locomotive superheater coils, manufacture of bushings, &c., and 8,324 seamless steel boiler and superheater tubes for different types of locomotives. Firms desirous of offering material of United Kingdom manufacture can obtain further details from the Department of Overseas Trade.

Beckett, Laycock & Watkinson Limited celebrates its Silver Jubilee on March 10.

## London-Glasgow in 6½ Hours by L.M.S.R.

As briefly announced (see p. 448) by Sir Josiah Stamp in his address to the shareholders last Friday, new high-speed express services are to be introduced in each direction between London and Glasgow beginning with the summer timetable on July 5. Two new trains leaving Euston and Glasgow (Central) respectively at 1.30 p.m. will perform the journey of 401.4 miles in 6 hr. 30 min. at an overall average speed of 61.8 m.p.h. The only stop in each direction will be at Carlisle, to set down on the northbound journey and to pick up on the southbound journey. The down train will cover the 299.1 miles to Carlisle in 283 minutes, at an average speed of 63.4 m.p.h. start-to-stop, and the 102.3 miles thence to Glasgow (Central) in 105 minutes at an average of 58.5 m.p.h. Similar average speeds will be maintained on the southbound journey. The journeys of these trains as between London and Carlisle will be the longest regular non-stop runs in the world at an average of over 60 m.p.h. start-to-stop. In connection with the introduction of the new trains, several important accelerations of ordinary trains will be made from Inverness, Aberdeen and Perth to London; and Manchester and Liverpool to Glasgow, Edinburgh and Perth. The new high-speed trains will each comprise nine coaches hauled by one of five new streamlined Pacific locomotives which are now being constructed at Crewe works. Although generally similar to the existing Pacifics, they will have a larger boiler, a larger fire-grate, and 6 ft. 9 in. driving wheels. The tender will hold 10 tons of coal and 4,000 gallons of water. Three complete new trains, each of nine coaches, are being built for the service at Wolverton. Each train will weigh 283 tons and will be 540 ft. long, excluding engine, with seating accommodation for 82 first class and 150 third class passengers. Two of the nine vehicles will be kitchen cars and a complete restaurant service will be provided; there will be dining seats for 168 passengers. In the interior decoration of the coaches, which will embody many novel features, woods of Empire origin will be exclusively employed.

## OFFICIAL NOTICES

## Crown Agents for the Colonies

## COLONIAL GOVERNMENT APPOINTMENTS

**A**PPPLICATIONS from qualified candidates are invited for the following posts—  
M/4967. **SECTION ENGINEER** required by the Government of Nigeria for the Railway Department for two tours of 12 to 24 months each with probability of further employment. Salary £475 a year for two years, then £500—£25—£600—£30—£840 a year. Free passages and quarters and liberal leave on full salary. Candidates aged 25-35 should be Corporate Members of the Institution of Civil Engineers or possess an Engineering Degree recognised as granting exemption from Sections A and B of the A.M.I.C.E. examination and have had practical experience in railway and bridge maintenance, reinforced concrete design and construction. Candidates who are students of the Institution of Civil Engineers and have had the requisite practical experience, are also eligible for consideration.

M/4964. **DRAUGHTSMAN** required by the Government of the Gold Coast for the Railway Department for two tours of 12 to 24 months with possible permanency. Salary £400—£15—£430 a year then £450—£25—£600—£30—£720 a year. Free passages, quarters and liberal leave on full salary. Candidates, aged 26—35, must have been articled for not less than three years to a recognised firm of Civil Engineers, and should possess an Engineering Degree recognised as granting exemption from sections A and B of the A.M.I.C.E. examination. Must have had experience in the preparation of plans, estimates, and specifications in connection with Railway Civil Engineering and be thoroughly competent draughtsmen accustomed to calculate stresses in simple structures. Preference will be given to candidates possessing a knowledge of surveying.

Apply at once by letter, stating age, whether married or single and full particulars of qualifications and experience and mentioning this paper to the Crown Agents for the Colonies, 4, Millbank, London, S.W.1, quoting the reference number against the appointment for which application is made.

**D**EPOT and Transport Manager of large undertaking requires new situation owing to merger of his company. Railway trained, fully qualified in all aspects of rail, road and shipping negotiations and operations, also depot control and costing, warehousing, bonding and Customs procedure. Apply Box 25, c/o THE RAILWAY GAZETTE, 33, Tothill Street, Westminster, S.W.1.

## The Bengal &amp; North Western Railway Company Limited

**T**HE Directors are prepared to receive Tenders for the supply of—  
26,850 TUNGSTEN FILAMENT LAMPS  
as per Specification to be seen at the Company's Offices.

Tenders addressed to the undersigned, and envelope marked "Tender for Lamps," with name of firm tendering, to be lodged not later than Noon on the 23rd day of March, 1937.

For each Specification a fee of 10s. will be charged, which cannot, under any circumstances, be returned.

The Directors do not bind themselves to accept the lowest or any Tender.

By Order of the Board,

J. WILLIAMSON,  
Managing Director.

237, Gresham House,  
Old Broad Street,  
London, E.C.2.  
2nd March, 1937.

## South Indian Railway Company, Limited

**T**HE Directors are prepared to receive Tenders for the supply of—  
1. Copper Plates (Flat and Flanged).  
2. Steel Tyres for Loco. Engines and Tenders.  
Specifications and Forms of Tender will be available at the Company's Offices, 91, Petty France, Westminster, S.W.1.

Tenders addressed to the Chairman and Directors of the South Indian Railway Company, Limited, marked "Tender for Copper Plates, or as the case may be, with the name of the firm tendering, must be left with the undersigned not later than 10 a.m. Friday, the 19th March, 1937.

The Directors do not bind themselves to accept the lowest or any tender.

A charge, which will not be returned, will be made of 10s. for each copy of Specification No. 1 and of 5s. for each copy of Specification No. 2.

Copies of the Drawings may be obtained at the Offices of the Company's Consulting Engineers, Messrs. Robert White & Partners, 3, Victoria Street, S.W.1.

E. A. S. BELL,  
Managing Director.

91, Petty France,  
Westminster, S.W.1.  
3rd March, 1937.

## The Bengal &amp; North Western Railway Company Limited

## The Rohilkund and Kumaon Railway Company, Limited

**T**HE Directors are prepared to receive Tenders for the supply of:—

288 STEEL AXLES ... for LOCOMOTIVES,  
6,302 HELICAL VOLUTE ... CARRIAGES and  
SPRINGS ... WAGONS.  
628 STEEL TYRES ...

as per Specifications to be seen at the Company's Offices.

Tenders addressed to the undersigned, and envelope marked "Tender for Axles, Springs, Tyres," as the case may be, with name of firm tendering, to be lodged not later than Noon on the 23rd day of March, 1937.

For each Specification a fee of 10s. will be charged, which cannot, under any circumstances, be returned.

The Directors do not bind themselves to accept the lowest or any Tender.

By Order of the Board,

J. WILLIAMSON,  
Managing Director.  
Secretary.

237, Gresham House,  
Old Broad Street,  
London, E.C.2.  
2nd March, 1937.

## Universal Directory of Railway Officials and Railway Year Book

42nd Annual Edition, 1936-37

Price 20/- net.

This unique publication gives the names of all the principal railway officers throughout the world, together with essential particulars of the systems with which they are connected. Much general and statistical information about railways is also concisely presented.

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## Forthcoming Events

- Mar. 5 (Fri.).—Institute of Transport (Leeds), at Town Hall, 6.30 p.m. "Canals—Yesterday and Today," by Mr. G. Hatcher.  
Omnibus Society, at Inst. of Marine Engineers, The Minories, London, E.C.3, 7 p.m. "Development of Road Transport in the Black Country," by Mr. A. Jensen.  
Mar. 6 (Sat.).—L.N.E.R. Musical Society, at City Hall, Newcastle, 7.15 p.m. Concert.  
Permanent Way Institution (Manchester-Liverpool), at Liverpool, 3 p.m. "Concrete Practice," by Mr. J. Elliott.  
Mar. 7 (Sun.).—L.N.E.R. Musical Society, at Spa Hall, Scarborough, 2.15 p.m. Concert.  
Mar. 8 (Mon.).—Institute of Transport (London), at Inst. of Electrical Engineers, Savoy Place, W.C.2, 5.30 p.m. "Notes on Commercial and Operating aspects of Trolleybus Operation," by Mr. T. Thomas.  
Institute of Welding (Tyneside), at Armstrong College, Newcastle, 7.30 p.m. "Welding of High Tensile, and some Alloy Steels," by Mr. H. Bull.  
Permanent Way Institution (London), at Underground Railways Dining Club, Pelham Street, S.W.7, 7 p.m. "The Evolution of Permanent Way," by Mr. Charles E. Lee.  
Stephenson Locomotive Society (London), at London School of Economics, Houghton Street, W.C.2, 6.30 p.m. "Some Geographical Studies of Railways," by Mr. S. Beaver.  
Stephenson Locomotive Society (Scottish), at Royal Technical College, George Street, Glasgow, 7.45 p.m. "The Mechanisation of Permanent Way Maintenance," by Mr. K. Reid.  
Mar. 8-13.—L.M.S.R. (London) Photographic Society, at Euston Station, N.W.1. Exhibition.

- Mar. 9 (Tues.).—Institute of Transport (Birmingham), at Queen's Hotel, 6 p.m. "The Management of a Large Goods Station," by Mr. C. Shaw.  
Institute of Transport (Nottingham Graduate), at Guildhall, 7 p.m. Paper by Mr. K. Laing.  
Institution of Civil Engineers, Great George Street, London, S.W.1, 6 p.m. "Welded Joints in Pressure Vessels," by Dr. S. Dorey.  
L.N.E.R. (Newcastle-Sunderland) Lecture and Debating Society, at Newcastle, 7 p.m. "Railway Maintenance," by Mr. H. Hills.  
Permanent Way Institution (Sheffield). Annual Dinner.  
Mar. 10 (Wed.).—Diesel Engine Users' Association, at Caxton Hall, Caxton Street, London, S.W.1, 4.45 p.m. "Improvements in the Economy and Output of Heavy Oil Engines," by Mr. J. Calderwood.  
Institute of Welding (London), at Inst. of Mechanical Engineers, Storey's Gate, S.W.1, 6.30 p.m. "The X-ray Examination of Welds," by Mr. V. Pullin.  
Institute of Welding (Scottish), at Royal Philosophical Inst., 207, Bath Street, Glasgow, 7.30 p.m. "Inspection of Welding," by Mr. N. Dobson.  
L.N.E.R. (Darlington) Lecture and Debating Society, at North Road Inst., 7.30 p.m. Annual General Meeting.  
Permanent Way Institution (Newcastle), at Mining Inst., Westgate Road, 7 p.m. "Some Permanent Way Problems," by Mr. C. Davison.  
Mar. 10-11.—Institute of Metals, at Inst. of Mechanical Engineers, Storey's Gate, London, S.W.1. Annual General Meeting.  
Mar. 11 (Thurs.).—Institute of Welding (Liverpool), at City Technical College, Byrom Street, 7.30 p.m. "The Effects of Welding

- Processes on Steel and Iron," by Mr. E. Atkins.  
Institute of Welding (Scottish), at Heriot Watt College, Chamber Street, Edinburgh, 7.30 p.m. "Inspection of Welding," by Mr. N. Dobson.  
Railway Club, at Royal Scottish Corporation Hall, Fetter Lane, London, E.C.4, 7.30 p.m. "Modern Locomotives of the Southern Railway," by Mr. J. Clayton.  
Mar. 12 (Fri.).—Institute of Transport (Newcastle), at Royal Station Hotel, 7.30 p.m. "The Machinery of Lloyd's," by Mr. H. Castwood.  
Institute of Transport (Newcastle Graduate), at Royal Station Hotel, 6 p.m. "Rail and Road Transport Co-ordination," by Mr. A. Currie.  
Institute of Welding (Midlands), at James Watt Inst., Newhall Street, Birmingham, 7.15 p.m. "Welding of Pressure Vessels," by Dr. S. Dorey.  
Mansion House Association on Transport, at Trocadero Restaurant, Piccadilly Circus, London, W.1, 1.15 p.m. Luncheon and Annual Meeting.  
Railway Convalescent Homes, at Wharnclyffe Rooms, Hotel Great Central, Marylebone, London, N.W.1, 6.15 for 6.45 p.m. Banquet.  
Mar. 13 (Sat.).—Stephenson Locomotive Society (Midlands-Northern), at 4, Bury Old Road, Manchester, 6.30 p.m. "Locomotives of the Western Section of the Southern Railway," by Mr. H. Kilpin.

## Forthcoming Meetings

- March 5 (Fri.).—London & North Eastern Railway Company (Ordinary General, followed by Special General), Wharnclyffe Rooms, N.W.1, at 2 p.m.



# Railway Share Market

A much better tone has been in evidence in the stock and share markets owing to the improvement in British Government stocks which resulted from a general realisation that it is unlikely there will be any material change in money rates for some considerable time. Home railway stocks were slow to reflect the better general conditions, and it was not until Wednesday that a firmer tone developed and this arose from the excellent impression created by the further good traffic figures which came to hand. It has, of course, to be realised that traffics in the first six weeks or so of this year compared with a period in 1936 when there were excessive movements of coal owing to fears of a coal strike. It is generally believed that the much better trend on traffics in evidence in recent weeks will be continued.

Great Western reacted early in the week but on Wednesday recovered from 57½ to 58½ following publication of the £22,000

traffic increase for the past week. L.M.S.R. ordinary was affected by the statements at the meeting that increasing sums will have to be expended on replacements, but the price rallied ¼ to 29 on last week's traffic gain of £61,000. Both the 4 per cent. preference and 1923 preference were again reactionary, despite the apparently attractive yields offered, and similar remarks apply to Southern preferred which is now down to 90. The deferred stock of the last named company failed to benefit from the encouraging impression created by the statements at the annual meeting, where it was indicated that traffics are likely to receive a fillip during the Coronation period. The past week's traffics, which showed an increase of only £3,000, were regarded as disappointing, but later the deferred stock showed a moderate improvement to 23. L.N.E.R. second preference has been out of favour and is now down to 22½, while

lower prices also ruled for the preferred and deferred stocks, sentiment having failed to benefit from the encouraging traffic increase of £68,000 for the past week. The first preference stock is now 69½ at which the yield appears unduly large. London Transport "C" was again out of favour and changed hands at lower prices.

Argentine railway stocks were more prominent. B.A. Gt. Southern has now risen to 35½ and the 5 per cent. preference and 6 per cent. preference have also shown good movements in favour of holders. Central Argentine rose to 33½ and the 4½ per cent. preference was also better at 72½ on the belief that its full dividend will be forthcoming this year. B.A. Western 4½ per cent. preference was favoured on current dividend estimates, while B.A. Pacific issues also participated in the better tendency. Antofagasta responded to the good traffic return

## Traffic Table of Overseas and Foreign Railways Publishing Weekly Returns

	Railways	Miles open 1936-37	Week Ending	Traffics for Week		No. of Weeks	Aggregate Traffics to Date			Shares or Stock	Prices			
				Total this year	Inc. or Dec. compared with 1936		Totals		Increase or Decrease		Highest 1936	Lowest 1936	Mar. 3, 1937	Yield % (See Note)
							This Year	Last Year						
South & Central America.	Antofagasta (Chili) & Bolivia	834	28.2.37	£ 22,080	+ £ 11,330	9	£ 135,680	124,740	+ 10,940	Ord. Stk.	25	15½	25	Nil
	Argentine North Eastern	753	27.2.37	7,388	+ 124	35	308,075	272,992	+ 35,083	A. Deb.	12	2	14½	9
	Argentine Transandine	—	—	—	—	—	—	—	—	6 p.c. Deb.	54	45	93	4½
	Bolivar	174	Jan., 1937	5,400	— 100	5	5,400	5,500	— 100	Ord. Stk.	16	11½	15½	Nil
	Brazil	—	—	—	—	—	—	—	—	Bonds.	16	6	12	3
	Buenos Ayres & Pacific	2,806	27.2.37	124,256	+ 22,083	35	3,036,147	2,797,104	+ 239,043	Ord. Stk.	17½	6	15½	Nil
	Buenos Ayres Central	190	13.2.37	£126,200	+ \$36,700	33	\$4,781,100	\$3,841,900	+ \$939,200	Mt. Deb.	31½	11	39½	Nil
	Buenos Ayres Gt. Southern	5,084	27.2.37	229,094	+ 74,837	35	4,980,415	4,498,218	+ 482,197	Ord. Stk.	313½	13¼	35	Nil
	Buenos Ayres Western	1,930	27.2.37	56,141	+ 4,517	35	1,661,926	1,537,804	+ 124,122	"	29½	11	31	Nil
	Central Argentine	3,700	27.2.37	182,056	+ 63,051	35	5,231,131	4,249,641	+ 981,490	"	32½	8½	33	Nil
	Do.	—	—	—	—	—	—	—	—	Dfd.	21	4½	17	Nil
	Cent. Uruguay of M. Video	273	20.2.37	13,861	— 443	34	421,921	360,540	+ 61,381	Ord. Stk.	75½	3	13	Nil
	Do. Eastern Extn.	311	20.2.37	2,491	+ 398	34	76,767	66,940	+ 9,827	—	—	—	—	—
	Do. Northern Extn.	185	20.2.37	1,733	+ 167	34	53,168	47,415	+ 5,753	—	—	—	—	—
	Do. Western Extn.	211	20.2.37	1,538	+ 236	34	35,853	29,888	+ 5,965	—	—	—	—	—
	Cordoba Central	1,218	27.2.37	28,470	+ 5,570	35	1,129,280	1,011,230	+ 118,050	Ord. Inc.	5	1	5½	Nil
	Costa Rica	188	Dec., 1936	19,353	+ 7,331	26	110,934	80,721	+ 30,213	Stk.	36½	32	37	5½
	Dorada	70	Jan., 1937	15,300	+ 2,000	5	15,300	13,300	+ 2,000	1 Mt. Db.	107	101½	104½	5½
	Entre Rios	810	27.2.37	12,860	+ 3,042	35	459,855	389,134	+ 70,721	Ord. Stk.	17	6	18	Nil
	Great Western of Brazil	1,082	27.2.37	9,100	+ 400	9	77,700	89,100	+ 11,400	Ord. Sh.	12	3½	34	Nil
	International of Cl. Amer.	794	Jan., 1937	\$516,579	+ \$15,044	5	\$516,579	\$501,535	+ \$15,044	1st Pr. f.	12	-/6	12	Nil
	Interoceanic of Mexico	—	—	—	—	—	—	—	—	Stk.	9	3	7½	Nil
	La Guaira & Caracas	221	Feb., 1937	4,925	+ 700	9	11,195	8,650	+ 2,545	Ord. Stk.	10½	3½	8	Nil
	Leopoldina	1,918	27.2.37	25,400	+ 9,809	9	185,533	158,943	+ 26,590	Ord. Stk.	92	31½	8	Nil
	Mexican	483	21.2.37	\$333,700	+ \$72,000	8	\$2,207,800	\$1,838,700	+ \$369,100	"	114	14	1	Nil
	Midland of Uruguay	319	Jan., 1937	10,650	+ 1,100	31	60,730	48,865	+ 11,865	Ord. Sh.	63½	41½	2½	Nil
Nitrato	387	28.2.37	8,961	+ 3,088	9	29,731	29,354	+ 377	Pr. Li. Stk.	85	71	81	7	
Paraguay Central	274	27.2.37	\$2,900,000	+ \$426,000	35	\$92,825,000	\$78,255,000	+ \$14,570,000	Pr. f.	15	9	14	Nil	
Peruvian Corporation	1,059	Jan., 1937	79,801	+ 3,318	31	570,580	537,416	+ 33,170	Pr. Li. Db.	18	16	22½	Nil	
Salvador	100	20.2.37	£40,500	+ £10,000	34	£683,008	£609,896	+ £73,112	Ord. Stk.	86	46½	95½	2½	
San Paulo	153½	21.2.37	32,875	+ 7,064	8	223,097	221,537	+ 1,560	Ord. Sh.	115½	14½	114	8	
Taital	164	Jan., 1937	3,590	+ 375	31	24,490	23,915	+ 575	Ord. Stk.	314	1	4½	Nil	
United of Havana	1,353	27.2.37	56,945	+ 744	35	726,222	690,794	+ 35,428	Deb. Stk.	5	3	—	Nil	
Uruguay Northern	73	Jan., 1937	1,032	+ 138	31	7,529	5,724	+ 1,805	—	—	—	—	—	
Canada.	Canadian National	23,564	21.2.37	699,062	+ 73,625	8	4,863,334	4,384,420	+ 478,914	—	—	—	—	—
	Canadian Northern	—	—	—	—	—	—	—	—	Perp. Dbs.	76	51	70½	5½
	Grand Trunk	—	—	—	—	—	—	—	—	4 p.c. Gar.	104½	99½	97	4½
India.	Canadian Pacific	17,223	21.2.37	479,600	+ 41,600	8	3,457,200	3,175,800	+ 281,400	Ord. Stk.	16½	10½	17	Nil
	Assam Bengal	1,329	10.2.37	40,852	+ 1,232	44	1,154,785	1,091,514	+ 63,271	Ord. Stk.	87½	82½	77½	3½
	Barsi Light	202	31.1.37	2,857	+ 1,733	43	96,037	119,565	+ 23,528	Ord. Sh.	77½	65½	62½	8
Various.	Bengal & North Western	2,107	10.2.37	91,005	+ 4,200	18	1,035,616	990,008	+ 45,608	Ord. Stk.	319	292½	315	5½
	Bengal Doars & Extension	161	10.2.37	3,338	+ 203	44	114,640	122,721	+ 7,931	"	127½	118	105½	5½
	Bengal-Nagpur	3,268	10.2.37	178,575	+ 2,880	44	5,169,318	5,526,676	+ 357,318	"	104	100½	98½	4½
	Bombay, Baroda & Cl. India	3,072	20.2.37	287,925	+ 5,475	45	7,806,075	7,319,475	+ 486,600	"	114	110½	111½	5½
	Madras & Southern Mahratta	3,229	31.1.37	179,100	+ 12,662	43	4,660,268	4,467,253	+ 193,015	"	116½	108½	107½	7½
	Rohilkund & Kumaon	572	10.2.37	19,947	+ 223	18	201,634	192,212	+ 9,422	"	311	286	312	5½
	South Indian	2,532	31.1.37	120,206	+ 11,278	43	3,352,583	3,283,962	+ 68,621	"	107½	102½	101½	5½
Various.	Beira-Umtali	204	Dec., 1936	68,774	+ 5,507	13	206,068	193,193	+ 12,875	—	—	—	—	—
	Bilbao River & Cantabrian	15	Jan., 1937	1,036	+ 282	5	1,036	1,318	+ 282	—	—	—	—	—
	Egyptian Delta	620	10.2.37	7,477	+ 545	44	211,820	219,712	+ 7,892	Pr. Sh.	214	15½	15	Nil
	Great Southern of Spain	—	—	—	—	—	—	—	—	Inc. Deb.	112	13	3½	Nil
	Kenya & Uganda	1,625	Jan., 1937	289,136	+ 55,760	5	289,136	233,376	+ 55,760	B. Deb.	50½	37	46	7½
	Manila	—	—	—	—	—	—	—	—	1 Mg. Db.	101½	101½	107	4½
	Mashonaland	913	Dec., 1936	128,131	+ 28,800	13	373,680	313,033	+ 60,647	Inc. Deb.	97	93½	96	4½
	Midland of W. Australia	277	Dec., 1936	14,803	+ 17,279	26	82,053	83,623	+ 1,570	—	—	—	—	—
	Nigerian	1,905	8.2.37	75,266	+ 17,279	41	1,810,231	1,413,958	+ 396,273	—	—	—	—	—
	Rhodesia	1,538	Dec., 1936	221,307	+ 35,843	13	664,648	575,985	+ 88,663	4 p.c. Db.	107	103½	109	3½
	South Africa	13,263	6.2.37	645,343	+ 27,320	45	27,450,864	25,534,646	+ 1,916,218	—	—	—	—	—
	Victoria	4,728	Dec., 1936	883,923	+ 13,486	17	3,126,552	3,136,262	+ 9,710	—	—	—	—	—
	Zafra & Huelva	112	Dec., 1936	16,027	+ 5,302	52	113,343	134,754	+ 21,411	—	—	—	—	—

NOTE.—Yields are based on the approximate current prices and are within a fraction of 1%.

† Receipts are calculated @ 1s. 6d. to the rupee, ‡ ex dividend. Salvador and Paraguay Central receipts are in currency.

The variation in Sterling value of the Argentine paper peso has lately been so great that the method of converting the Sterling weekly receipts at the par rate of exchange has proved misleading, the amount being overestimated. The statements from July 1 onwards are based on the current rates of exchange and not on the par value.

# Electric Railway Traction

## The Price of Current

**A** MOST disturbing sidelight on current consumption and generation as it affects British railway electrification was revealed by Mr. R. Holland-Martin in his speech to the shareholders of the Southern Railway on February 25. It was that despite the continuous expansion of the Southern's electrified system the price paid per unit of current is going up. The position is not quite so bad as it might have been, for the Southern is fortunate in possessing a power station of its own at Wimbledon, which supplies some of the energy required. But the bulk of the current is purchased from supply companies operating under the grid scheme, and the price of this current advanced during the year 1936 by 0.043d. per unit, whereas the cost of that produced by the Wimbledon plant increased only by 0.013d. per unit. *In toto*, these increases cost the Southern Railway £52,000 during the year, whereas that organisation might reasonably have expected to obtain something like an equivalent reduction. About 16 or 17 years ago, when the Southern was contemplating large extensions to its suburban electrification, the Government, then in the early pains of the grid, refused the railway permission to erect any new generating stations on the ground that when the grid was an accomplished fact, current would be cheaper to buy from bulk supplies than to generate in railway-owned stations. The fallacy of this is now being proved at the cost of a considerable sum weekly, and therefore it was all the more surprising to read in Mr. C. E. Fairburn's recent paper to the Railway Students' Association that there was evidence that the importance of cheap current was recognised in proper quarters. Obviously these quarters are not influential ones, but even if they were influential it does not mean that the trouble would be remedied, and in reply to a question at the Southern Railway's annual meeting Mr. Holland-Martin said he did not think it would be of the slightest use to apply afresh to the Minister of Transport for permission to build their own power stations for future extensions.

## Electrification in New South Wales

**O**NCE more the electrification of the Sydney-Newcastle main line of the New South Wales Government Railways is being discussed, this time in connection with a general electricity scheme, which will require for its efficient operation the electrification of the lines from Sydney to Nowra, Lithgow, and Goulbourn also, that is, on sections of all the four main lines radiating from the capital city. Hydro-electric power generation is to be considered for the scheme as a whole, but at the moment it does not appear to be certain that the water resources are sufficient, and steam stations may form part of the proposed grid. The New South Wales Government Railways already have four steam power stations, only two of which, those at White Bay and Ultimo, are concerned with the supply of energy for railway traction purposes. In the last fiscal year these two plants supplied 187,246,853 kWh. to the Sydney suburban system, 138,040,302 kWh. to Sydney and district tramways, and 98,073,617 kWh. for other purposes. The Newcastle

power station generated 104,889,403 kWh., of which 80 per cent. was sold to outside bodies, and the Lithgow station produced 14,243,825 kWh., of which 85 per cent. was sold outside. Quite apart from any national grid scheme it would appear that electrification would be a paying proposition on certain routes out of Sydney, but the Government Railways' electrical engineer considers that cheap energy will never be available in the populated country centres unless power schemes are assisted by railway electrification. As regards fuel and energy charges, the cost for a 300-ton steam hauled train on a normal N.S.W. main line is about 4.5d., compared with an estimate of 2.0d. if the same train was pulled by an electric locomotive. On the Sydney electrified suburban lines, which of course are operated solely by multiple-unit trains, the cost per 10,000 gross ton-miles, including overhead and administration charges, is £10.85. Of this total the cost of the fuel burned in the power stations is only £0.42, and administration plus overhead expenses, £1.125. So far as the new electrical development scheme is concerned, the most curious point is that electrical experts do not appear to have taken any leading part in it, for press reports give all the credit to the Prime Minister, Mr. Stevens, who, it is stated, studied electricity schemes while abroad last year.

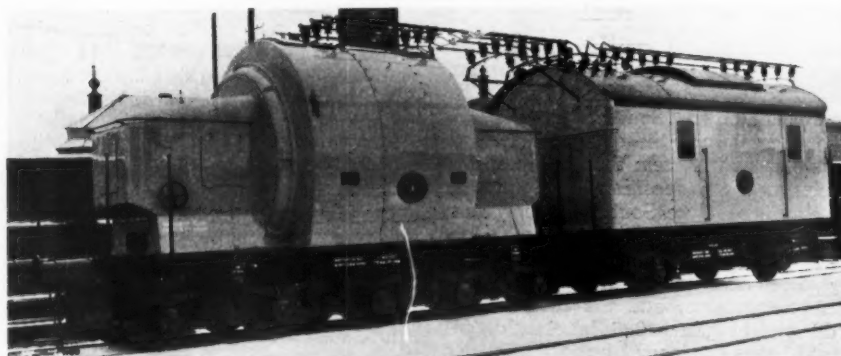
## Rectifiers and Communication Interference

**A**LTHOUGH there are many rectifier traction sub-stations operating satisfactorily without the use of any smoothing equipment, a rectifier is liable to cause interference with wired and wireless communication circuits. As a rule any faults experienced may be overcome by the installation of a smoothing circuit comprising, say, a d.c. air-core self-cooled reactor coupled to the main negative connection to the transformer neutral, and a series of resonant shunts and condensers tuned to the frequencies of the principal harmonics in the d.c. voltage and connected across the d.c. system. As an alternative to the insertion of filters for the four principal harmonic voltages in a six-phase transformer connection, the use of a twelve-phase connection is advocated sometimes, but commenting on this in his report on electric traction to the International Railway Congress Association, Mr. C. E. Fairburn, Chief Electrical Engineer of the L.M.S.R., says that while such an arrangement gives a better power factor, the transformer is rather more complicated, and that there is a possibility of the rectifier becoming unstable and working as a six-phase unit. Although the percentage ripple in the output is about half that found in an unsmoothed six-phase rectifier it is still large compared with the ripple in a six-phase plant operating with filters. The twelve-phase connection is used more particularly in glass-bulb rectifier sets where standard six-anode bulbs can be arranged to form two six-phase systems with a relative displacement of 30 deg. But even if interference should occur it may not be absolutely essential to instal filters or adopt a twelve-phase connection, for if the trouble is associated only with one or two communication circuits it may be cheaper to balance these rather than add to the rectifier equipment.

## THE SUBSTATIONS OF THE SWEDISH STATE RAILWAYS

By I. ÖFVERHOLM, Chief Electrical Engineer, Swedish State Railways

(Continued from February 5 issue)



Mobile substation of Type IV with transformer wagon

Substations of type III have neither crane nor lowering platforms and furthermore there is no cellar. Maintenance and repairs are carried out at the nearest suitable workshop to which the sets travel on their own wheels, as do the transformers in the grid substations of the latest type.

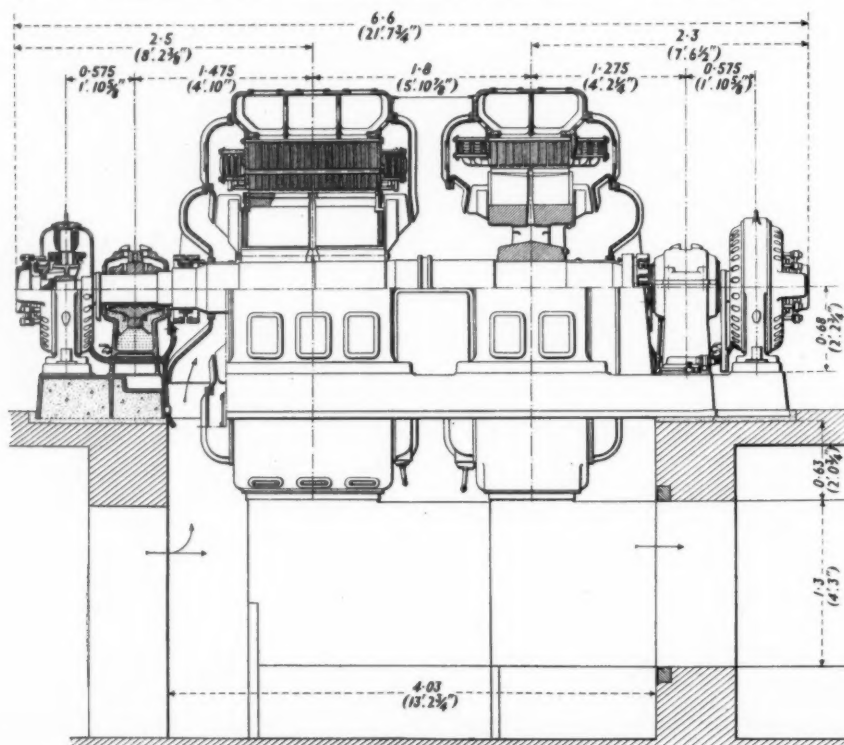
A fourth kind of substation is under construction. It differs from type III as regards the line switchgear and the control room equipment which with type III are stationary but with type IV are mounted in a special carriage. Type IV substation is thus mobile in its entirety, and can,

if required, be used to substitute another substation, if this has to be taken out of service for any reason.

Three-phase power is delivered to the substations and metered at 6.3 kV. (in one case 5.25 kV.). Energy is charged in accordance with a three-part tariff, a necessary complication in order to obtain the most favourable cost to the railway. The three parts are:—

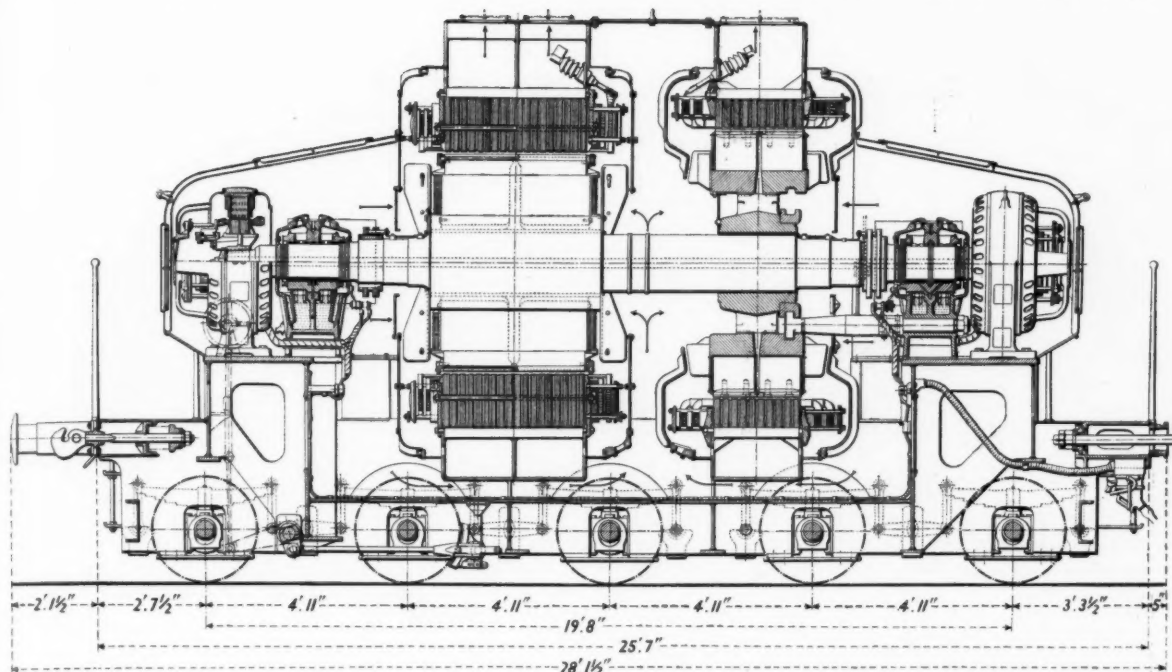
1. A fixed yearly charge for transmission,
2. A charge of £5 0s. 6d per kW. per annum for basic power,
3. A charge of £1 16s. 1d. per kW. per annum for peak power and in addition 0.309d. per unit.

The total amount of energy consumed and its cost is



Cross section through stationary motor-alternator set as used in the substations of the Swedish State Railways electrified lines. (Types I and II)



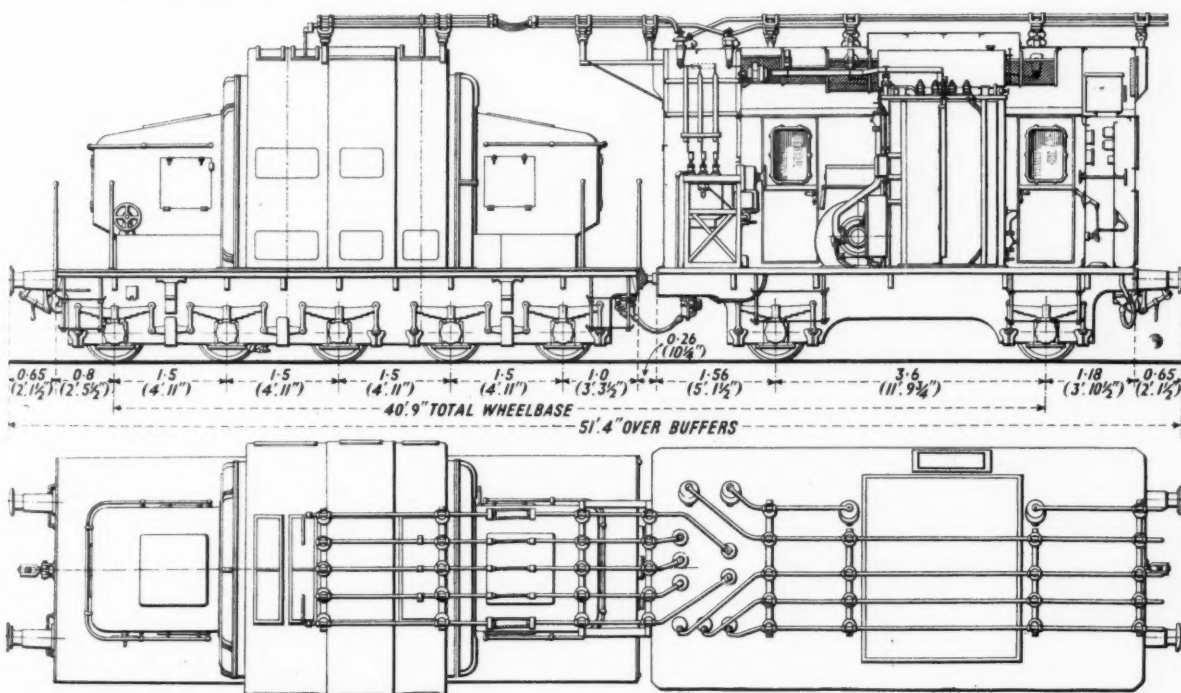


Sectional view of mobile motor-alternator set with a continuous rating of 2,400 kVA

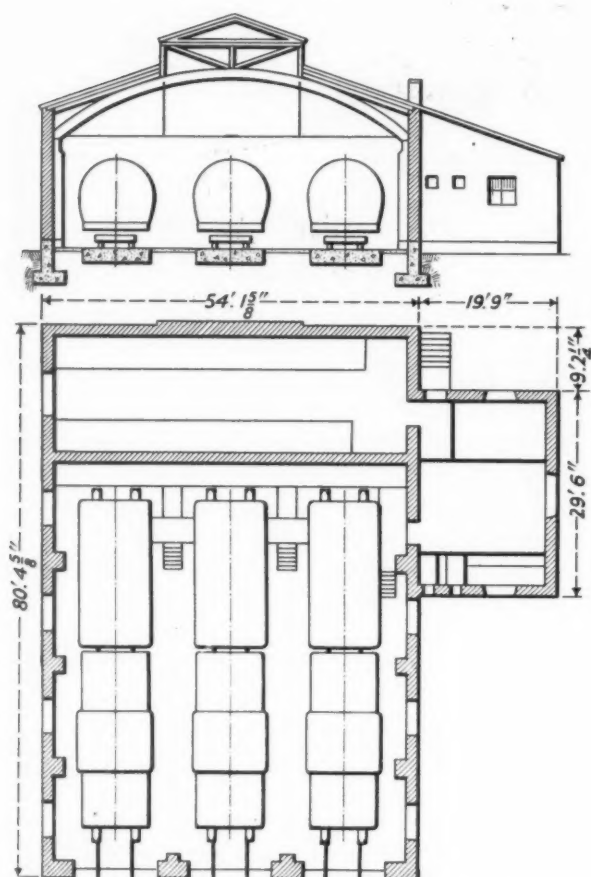
scheduled in Table II, actual figures being given for 1935 and also calculated figures for 1938, the first year that the entire electrification programme now decided upon will be in operation. The energy conversion for each of the 15 substations in use in 1935 is given in the second table.

With the method of charging used it is necessary to

summate the total load at all the substations at each moment. A pair of communication wires in the railway cable laid along the electrified lines serves this purpose together with summing instruments, maxigraphs and duration meters. The latter register the actual total duration of loads over certain kW. levels and in addition show the maximum quarter-hour consumption, the total con-



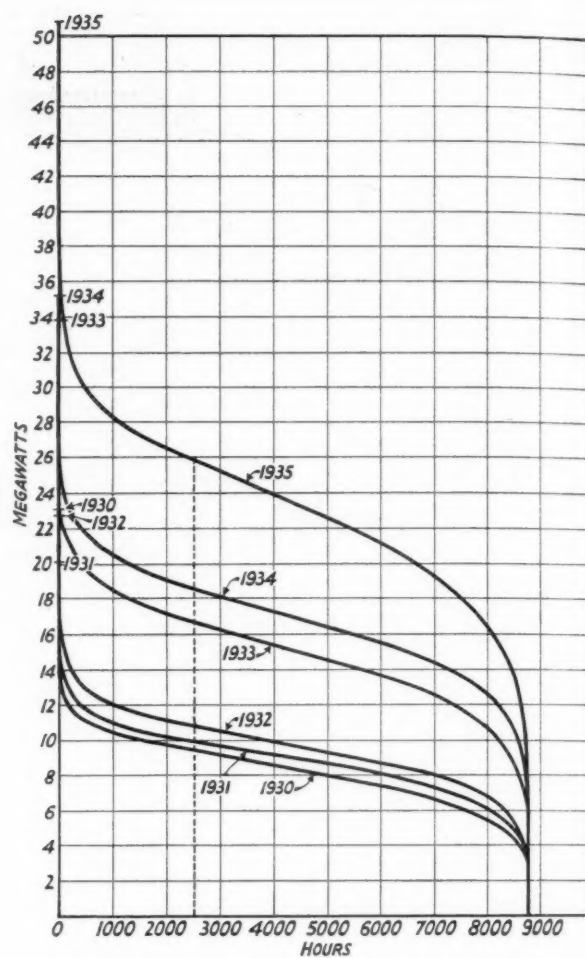
Arrangement of mobile motor-alternator set for Swedish State Railways mobile substation, Types III and IV



Sectional arrangement and floor plan of stationary substation of Type III

sumption in units and also the amount of peak power units. At the beginning of each year the State Railways announce to the power producer the amount of basic power to be contracted for that year.

Duration curves for the years 1930-1935, and relating to power delivered by the Royal Board of Waterfalls to



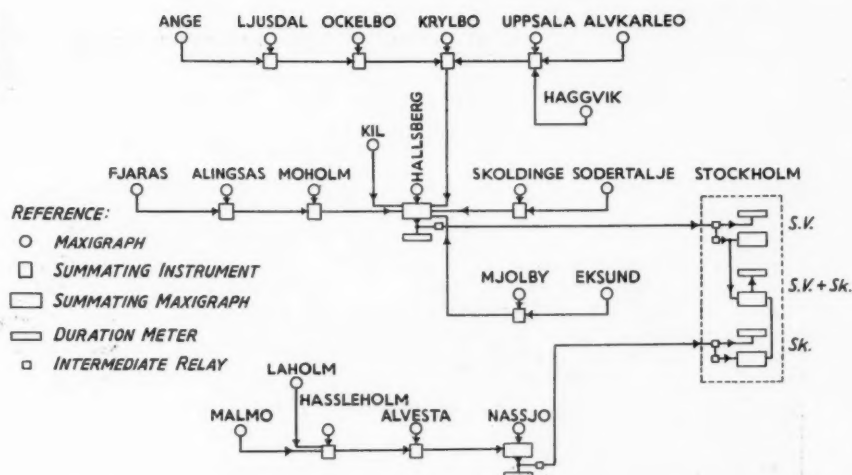
ENERGY CONSUMPTION OF ELECTRIFIED RAILWAYS SOUTH OF ÅNGE			Max. load in average values of 15 min.
Year	Energy cons. units		kW.
1930	73,074,590		23,100
1931	78,277,000		24,100
1932	84,728,000		22,800
1933	130,899,000		33,800
1934	148,076,500		35,200
1935	203,427,000		50,800

Curves of power supplied by the Board of Waterfalls

TABLE I.—ENERGY CONVERSION IN THE SUBSTATIONS OF THE SWEDISH STATE RAILWAYS IN 1935

Substation	Transmitted energy, 16 $\frac{2}{3}$ cycles. kWh.	Transmitted energy, 50 cycles. kWh.	Losses in frequency-changing. kWh.	Total energy on 50-cycle busbars. kWh.	Maximum load on 50-cycle busbars. kW.	Load-time h.
Ockelbo	696,000	29,450	210,550	936,000	5,100	—
Krylbo	9,177,000	505,203	2,293,797	11,976,000	5,700	2,100
Uppsala	16,118,000	452,040	3,469,960	20,040,000	8,000	2,505
Södertälje	40,828,300	629,450	7,624,250	49,082,000	15,100	3,250
Sköldinge	9,459,900	333,950	2,022,150	11,816,000	5,300	2,225
Hallsberg	23,133,700	3,926,743	4,811,557	31,872,000	9,600	3,320
Moholm	14,400,800	481,335	2,401,865	17,284,000	6,900	2,505
Alingsås	19,176,900	452,530	4,485,570	24,115,000	8,700	2,770
Eksund	15,198,700	543,797	3,252,503	18,995,000	6,500	2,920
Mjölby	14,587,500	651,040	3,008,460	18,247,000	5,900	3,090
Nässjö	18,936,200	823,110	3,533,690	23,293,000	8,900	2,620
Alvesta	9,953,800	285,210	1,668,990	11,908,000	5,500	2,165
Hässleholm	10,505,400	370,850	1,837,750	12,714,000	6,200	2,050
Malmö	24,440,500	2,404,120	5,190,380	32,035,000	10,600	3,020
Laholm	3,838,300	189,172	962,528	4,990,000	4,300	—
Total	230,451,000	12,078,000	46,774,000	289,303,000	62,400	4,540

Diagrammatic view of arrangements for bulk measuring of energy supplied to the electrified lines of the Swedish State Railways



substations north of Nässjö and Laholm, are shown in one of the accompanying graphs. For an explanation of the rapidly increased consumption, the diagrammatic view of the progress of the electrification from 1915 to 1937 may be referred to. It is evident from that diagram that since 1932 the work has been accelerated, and not less than 32 miles of track are being electrified each month, or a mile a day.

Several electrical manufacturers have suggested frequency-changing by static means, through the medium of mercury arc discharge vessels, or so-called transverters. When called upon to produce the necessary apparatus they have so far not been successful, but it is now said that the problems may be solved so that commercial apparatus can be produced in two or three years' time. Experience has already proved that the matter was not so simple as it looked. It has been impossible for the Swedish railway electrification to await developments in this direction. It has been desired always to carry out the work expediently, and it would appear that the eventual losses will be negligible.

In 1938 the losses in frequency-changing on the State Railways will amount to 65 million units (see Table II). Early expectations put the transverter efficiency at 95 per cent., later a reduced figure of 90 per cent. has been mentioned as possible. The gain as compared with the rotating plant would then be 6.5 per cent., representing 25 million units, or in money £19,330, in savings for the year 1938. This, however, means little compared with the advantages offered by the present system in other respects. The motor-alternators serve as a kind of safety

valve, and a very efficient one. Short circuits on the low frequency distribution are never felt on the three-phase power system, and the short-circuit current is furthermore reduced to less than 4,000 amp. on the single-phase side. As a comparison it may be mentioned that some other electrified railways are subjected to short-circuit currents amounting to 40,000 amp. and more. The result is that with the Swedish system cheap maintenance and very smooth running is obtained—so smooth, in fact, that one now and then wonders whether electrical operation is really in use.

## Publications Received

**Electrical Glossary.**—The British Standards Institution has published a revised and enlarged edition of the glossary of terms used in electrical engineering. Although intended mainly to cover the terms used in this country and the British Empire, there has been coördination with the International Electrotechnical Commission, which body, incidentally is to publish during the course of the present year the first edition of an electrotechnical vocabulary intended for international use.

**Electrical Year Book, 1937.** London: Emmott & Co. Ltd., 28, Bedford Street, Strand, W.C.2; Manchester: 31, King Street West. 6½ in. × 4½ in. 315 pp. and diary. Illustrated. Price 1s. 6d. net.—Up-to-date statistics as regards the electrified railways throughout the world are given in the new edition of this annual pocket-book, and the mileages of the various systems of electrification in different countries are tabulated. There is a short section on traction motors and a general section on electric traction. Rectifiers for all purposes are covered in a separate chapter, but the rectifier shown in the principal sectional drawing appears to be of Siemens-Schuckert make and not a true British type. Lighting, batteries, welding, power generation and transformation and switchgear are covered in various chapters and the correct reference is found easily from the index, which contains nearly 500 entries.

**CAMBERWELL TUBE**—According to a letter sent by the London Passenger Transport Board to various South London local authorities, the long-mooted extension of the Bakerloo tube from Elephant and Castle to Camberwell Green has now progressed to the stage where it is being considered by the standing joint committee of the L.P.T.B. and the four main-line railways. It is expected that a decision will be reached towards the end of March.

TABLE II.—SCHEDULE SHOWING ENERGY CONSUMPTION ON THE ELECTRIFIED SWEDISH STATE RAILWAYS SOUTH OF ÅNGE

	1935	1938
Total energy consumption on 50-cycle busbars .. units	289,303,000	410,000,000
Energy supplied at 50 cycles ..	12,078,000	15,000,000
" " 16½ " " "	230,451,000	330,000,000
Total energy transmitted ..	242,529,000	345,000,000
Losses in frequency changing .. units	46,774,000	65,000,000
Total cost of electrical energy ..	£331,000	£431,000
Mean unit cost of energy transmitted* ..	0.328d.	0.301d.
Mean unit cost of total energy ..	0.275d.	0.252d.

\* By energy transmitted is meant total energy less losses in frequency changing. Conversion figures used, £1 = 19.40 Sw. Kr.



## RAILWAY ELECTRIFICATION

*Summary of a paper read before the Railway Students' Association*

*By C. E. FAIRBURN, Chief Electrical Engineer, L.M.S.R.*



*Six-coach train on the low-tension d.c. Euston-Watford lines, L.M.S.R.*

**I**N the country which has the highest percentage of electrified lines in the world, Switzerland, it is found that the primary reason for electrification was not directly connected with the operation of the railways. The country has no coal resources, but there is an abundance of water power. During the war the Swiss realised how much they were dependent on other countries for coal, and in consequence the use of hydro-electric power was developed, although in many instances energy so obtained costs more than it would from steam-driven plant. Having decided to develop this power the natural sequence of events was to use electricity on the railways; 75 per cent. of the State-owned lines, handling 92.5 per cent. of the traffic, have now been converted, and progress has been made on the privately-owned lines.

A different example is to be found in South Africa on the electrified sections in Natal. The line is largely single track; the gradient is 1 in 65 for long distances, and the traffic consists mainly of heavy freight and mineral trains. Under steam operation trains of about 850 tons maximum weight could be hauled at a speed of only 7 to 8 m.p.h. over the most difficult section, and with growing traffic came the question of whether the track should be duplicated or some other method adopted. Track doubling would have been an expensive matter and would not have increased the running speed of trains, nor the weight that could be hauled in one train, and as a more satisfactory solution electrification was decided upon. By using electric locomotives coupled together in multiple-unit, it was found possible to increase the power available until the tractive effort reached the limit set by the drawgear, and trains of 1,500 tons are hauled at 21 m.p.h. up the steepest gradients, thus greatly increasing the capacity of the line. In this case, therefore, electrification was carried out mainly to avoid costly civil engineering work.

There is a short but interesting line in the South Island of New Zealand. Owing to the presence of a mountain range, heavy goods were transported from east to west coasts by a rather dangerous sea route, and passengers used a mountain road which was often rendered im-

passable by bad weather. Under good conditions the land journey took two days. The building of a railway between the coasts involved the construction of the Otira tunnel. Its length of 5.3 miles, and the ruling gradient of 1 in 33 would have made steam operation impossible owing to the difficulty of ventilation, and a track length of 8.4 miles between Otira and Arthur's Pass, including the tunnel, was electrified when the line was built. The journey from coast to coast can now be made in less than five hours.

In the United States, the railways have been required by legislation to eliminate smoke nuisance in cities such as New York, Cleveland, Philadelphia, &c., and this could be done only by electrification. In such a case it is obviously uneconomical to use electric locomotives within the city boundaries only, as the daily mileage of an electric locomotive must be fairly large for economical working, and so the electrified lines have been extended for considerable distances beyond the towns.

In Copenhagen the suburban electrification was brought about by two causes. Firstly, there were no adequate means of dealing with the dense suburban traffic, and secondly there is a tunnel about two miles long running under the centre of the city, with shafts at regular intervals by which smoke was allowed to escape into the main streets. Here, then, the reasons for electrification were, first, the fact that steam stock could not deal satisfactorily with the traffic, and, secondly, the smoke nuisance.

Summarising the reasons for the electrifications mentioned above it is found that they fall into the following categories:

- (1) Provision of intensive suburban services.
- (2) Lack of native coal and availability of water power in a country.
- (3) Avoidance of civil engineering work, such as the duplication of existing tracks.
- (4) Handling traffic on heavy gradients.
- (5) Elimination of smoke.

### British Problems

In Britain conditions are different. The problem of handling dense suburban traffic has brought about a

number of electrification schemes. For example, the Southern Railway has the biggest electrified suburban system in the world. The L.M.S.R. has electrified several of its own lines, and, in conjunction with the L.N.E.R., the Manchester and Altrincham line.

There appears to be little general possibility in Britain of electrifying to increase the capacity of existing tracks in order to avoid duplication, as the railways have not yet found the existing lines to be loaded up to saturation point, although there are some sections which are pretty heavily worked. The presence of heavy gradients can hardly be a big factor. Such gradients as we have which are at all comparable with those in, say, Natal, are short, and their influence on the maximum load which can be hauled and on the end-to-end time of a journey is usually so small that they can be neglected. An exception can be found on the L.N.E.R. main line between Manchester and Sheffield, where electrification is now in progress.

If these points are considered it will be seen that Great Britain has to view the question of electrification on different lines from most other countries. It is quite certain that the increasing density of suburban traffic will have further results, but this is not likely to bring about electrification for more than a few miles outside large towns, and when electrification is spoken of it is usually main-line electrification that is meant.

How can the problem in this country be tackled? The only answer is that it must be considered on economic grounds, in other words, electrification can only take place if it can be shown that it is definitely cheaper than steam. The two factors that make up the cost of running any railway are the capital charges and the operating cost. With regard to the former, when a line is electrified the running track, stations, and signals, remain unchanged, but there must be added the conductor system and substations. Electric locomotives must be substituted for steam locomotives, and unfortunately the electric locomotive costs much more than the steam locomotive. Therefore the capital cost under electric operation must be considerably in excess of that under steam. In consequence, the capital charges are higher, and it is by savings in the operating cost that the excess must be recovered and a balance gained. Leaving aside smaller items, the operating cost consists mainly of the cost of power, maintenance and repairs, and wages.

The Weir Report gave an estimate for the complete electrification of the British standard gauge railways. Concerning the cost of power, the report showed that electricity, at the price then quoted by the Central Electricity Board, viz., 0.475d. at the substation d.c. busbars, cost almost as much as coal for steam locomotives; in fact, the figures given were £11,280,000 for electric power and £13,194,000 for coal and water. To this must be added the maintenance costs of the overhead line and the substations, and these were given as £3,385,000 and £1,056,000 respectively, so the real cost of power under electric operation was given as £2,527,000 more.

On the other hand the repair cost of the electric locomotive is considerably less than that of the steam locomotive, and the figures given in the Weir Report were £4,660,000 as against £10,819,000, while on running, maintenance, and cleaning a further considerable saving would be expected, giving a total saving of £7,296,000. Large savings in the wages of the train staff would be gained due to the higher operating speed and the almost complete elimination of the time now spent by the locomotive crews on shed duties. In the Weir Report this saving is estimated at £11,195,000. These figures give an annual saving on operating and repair costs of £15,964,000. There would be additional savings in auxiliary power supplies and train lighting sets, and the

net saving due to electrification was estimated at £17,300,000.

A great point was made in the report of the availability of the electric locomotive over the steam locomotive, and if this could be fully exploited it would have an important bearing on the problem. The difficulty on a railway is to arrange the services so that this advantage can be realised, and it is by no means an easy problem. There are other ways in which electrification would save money, such as the abolition of water-softening and coal-handling plants, and less frequent painting of stations and bridges. It would appear, therefore, that one of the first things needed is a lower cost of energy, and there seems to be evidence that this is appreciated in the proper quarters. [See comment on first page.—ED.]

Returning to the greater availability of the electric locomotive, the effective use of this is a difficult problem, as it means the re-scheduling of all services from start to finish on entirely different lines from those now used.

### Electrification is Cheaper Now

Certain recent developments have tended to make electrification easier and cheaper. Three of the most important are:

- (1) The evolution of the diesel-electric shunting locomotive.
- (2) The evolution of the mercury arc rectifier.
- (3) The progress that has been made in the manufacture and design of higher voltage d.c. equipments.

The use of welded rail bonds may also be mentioned as a less important contribution.

Either third rail or overhead systems, when applied to large yards, involve capital cost on which an adequate return cannot be earned, but the introduction of the diesel-electric shunting locomotive has gone far to solve the problem. Its use makes it unnecessary to instal live conductors in the sidings beyond four or five locomotive lengths, to enable an electric locomotive to bring the train into the yard. It may be asked, why should a steam locomotive not be used instead of a diesel shunter? The answer is that to get full economy from electrification all stocks of coal, water supplies, water-softening plant, &c., must be abolished, and a separate shed staff for dealing with steam locomotives only cannot be retained. With diesel shunters the electrical parts can be maintained by the electric locomotive staff.

The simplicity and reliability of the mercury arc rectifier have enabled the unattended single-unit type of substation to be adopted with confidence. As such stations contain practically no rotating machinery, the degree of attention required is small, and a whole system can be controlled readily from a single supervisory point. Inspection is required only at infrequent intervals, and the length of time to put a rectifier in service is very short.

Since the war great strides have been made in the design and manufacture of higher voltage (say 1,500 volts) d.c. equipments. The use of the higher voltage enables the substations to be placed at wider intervals, or alternatively, the size of the conductors in the contact system to be reduced; further, the efficiency of the rectifiers increases with the voltage.

Switchgear has been improved also, and the evolution of the high speed d.c. circuit-breaker has helped to give confidence in the supervisory substation system mentioned before. The use of welded bonds for running rails is a small point, but one which has an influence on the cost. The welded bond is about 8 in. long, whereas bonds hitherto have ranged up to 50 in., depending on the type and on the system, and have required to be of greater cross section also. There is a big saving of copper here, and the labour cost of welding has been reduced to little more than that of drilling holes in the rail and pressing in the old type of bond.

## THIRD-RAIL ELECTRIFICATION

### *Southern Railway Chairman's pertinent comments on alleged dangers of low-voltage d.c. systems with conductor rails*

*For some months now there has been a great controversy as to the safety of third-rail electrification, more particularly in the area served by the ever-increasing network of the Southern Railway's electrification. A full statement as to the actual danger to human and animal life, and an account of the railway's point of view, was given by Mr. R. Holland-Martin, Chairman of the Southern Railway, in his recent annual speech to the shareholders. It is reproduced in extenso on this page, and is so comprehensive that comment is needless.*

You will probably have seen in the press that our Bill, which contains scarcely any contentious matters, has been persistently blocked in the House of Commons for no reasons connected with opposition to anything contained in the Bill, but because the objectors allege that the extension of the third rail system into rural districts is dangerous to human beings and in particular to children and to livestock and to the amenities of the countryside.

#### **Agricultural Protest**

The present protest against the third rail began in the neighbourhood of Horsham, and we had the pleasure of meeting a deputation representative of landowners (C.L.A.), farmers (F.U.) and estate agents. It was stated that the extension of the third rail was a terror in the minds of parents, of farmers whose cattle might leave the crossings and try to go up the line, and of hunting folk whose energies even now were diverted from riding to hounds to heading the fox and the hounds wherever the electric line was in front of them. If these terrors had any foundation they would form a strong indictment of our system, so we could not be other than sympathetic. We enquired as to the fatalities on which they were based and how the deputation would propose to deal with extensive electrification, since it could hardly be supposed in view of the millions we have expended on electrification in installing one of the only two systems allowed by Parliament, we could lightly scrap our system and substitute for it the only other permitted system, the overhead.

It was suggested that if the whole third rail system could not be scrapped, it might at some point be converted to overhead; that, alternatively, some system might be installed whereby the rail was only intermittently electrified for the passage of a train; or that there might be some means devised of protecting the third rail by a covering. To those not versed in electric problems, one or other of these solutions may seem possible, but each has very serious objections.

#### **Parliamentary Decision as to System**

In the first place, it must always be borne in mind, as I have stated above, that after very serious consideration, Parliament decided on two, and only two, methods: the low voltage system with the third rail and voltages up to 750 volts, and the high voltage system with overhead wires and voltages up to 1,500 volts; both to be d.c. In our case we use the low voltage third rail system with a voltage of about 600. Both systems have their advocates, and it was only after very careful investigation and examination by experts that the board of this railway after amalgamation decided that of the two systems then existing on their railway—the overhead used by the L.B. & S.C. and the

third rail used by the L.S.W.R.—it would adopt the third rail, which system has, as you know, proved very successful.

Could protection be given by putting a board protection at each side, as is sometimes done now in special places? This has technical and working objections. What then, of the intermittent section to be charged or made dead by the passage of a train? Our trains follow each other so frequently that this system is quite impracticable, but if it were not it would introduce the danger that no one would know whether the current was "on" an electric line or "off."

#### **Protective Devices**

Now as to danger. The low voltage used (about 600) does not involve in the case of a healthy person more than a sharp shock. There have therefore been few fatalities, I am glad to say, to human beings. I will return to this later. Under Government regulations, the line has to be fenced, and the most modern method is by using posts and eight strands of wire. Our standard fencing has a minimum of ten wires in electrified areas, and where there is special danger of its being climbed or got through by children or animals, a wire mesh is added. That is to say, the electric line runs in a fenced conduit throughout its length, save where another fenced line comes in or an unfenced siding, or where there is a platform crossing or a cattle or footpath crossing. A footway or cattleway is never carried over the third rail—the third rail ceases on each side of a public crossing, so that the only people or animals that can be harmed are those who leave the crossing and proceed along the line.

Here again, if the passenger crossing is a busy one a footbridge is put up, and at a cattle crossing a grid of triangular pieces of wood that animals will not walk on or over is put down on either side of the crossing. Casualties from persons or animals walking up the line from crossings have been very rare, and the accidents that are attributable to shock have been confined to a few persons who have climbed over the fence for some purpose of their own. A certain number of stray dogs and cats have been electrocuted, also a few hounds, and in country districts with rivers like the Firle area, some otters and badgers have been killed. These last mentioned animals are particularly prone to shock, for not only are their coats usually damp, but they apparently try to get under instead of over the third rail.

#### **The Public's Liability**

The company will, as it has always done, take every and ample care to prevent improper access to its line, but the public on their part must realise that a railway line with its fast and increasing service of trains and with the additional danger of the electric current differs little in negotiability from a fast flowing fordable river, and should only be crossed where crossings are provided for the public. Were this recognised, the number of fatalities, now remarkably few compared with those resulting from other forms of transport, would be confined to those who get on the line with intent to destroy themselves. Such are the facts of the case, which I hope will allay the alarm which has arisen in West Sussex.